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ABSTRACT

This document contains six articles. The first article describes the current status of education in the United States. The second article describes what changes to expect in adult and student populations, migration, the economy, and support for public education in the Mid-continental region. The next four articles provide snapshots of the region through four lenses--curriculum and instruction, professional development, technology, and finance. Contents include: (1) "The Good, and the Not-So-Good, News about American Schools" (John F. Jennings and Diane Stark Rentner); (2) "Demographics in the Heartland" (Harold Hodgkinson); (3) "What's Pressing? Everything!" (Joan L. Buttram); (4) "Targeting Professional Development At Student Success" (Ceri B. Dean and Fran E. Mayeski); (5) "Reshaping Schools for the Information Age" (James D. Parry); and (6) "Issues and Trends in School Finance" (Michael L. Arnold). Chapters contain references accompany the chapters. (LMI)

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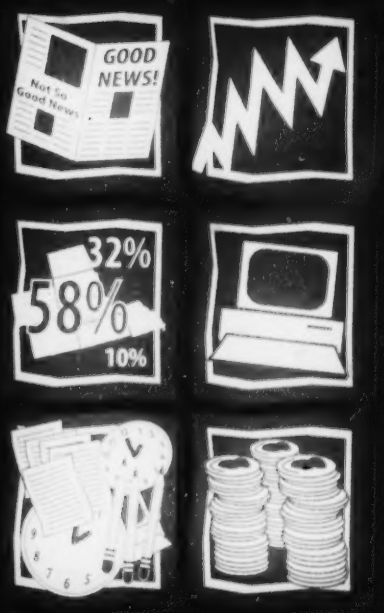

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Mid-continent Regional Educational Laboratory

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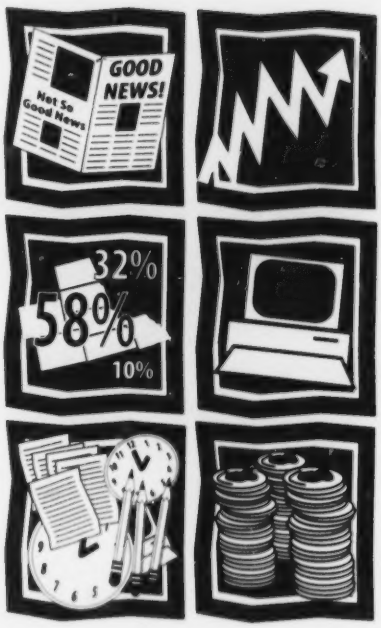
What's Noteworthy on...

Education Issues in the Heartland



McREL
Mid-continent Regional Educational Laboratory

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McREL

Dear Colleagues:

This is the first *Noteworthy* to be published as part of our most recent contract with the U.S. Department of Education, Office of Educational Research and Improvement. Under this contract, McREL will continue to provide educators and policy makers in the seven state region — Colorado, Kansas, Missouri, Nebraska, North Dakota, South Dakota, and Wyoming — with the best and most recent research information and assistance available to help advance education reform.

In this issue of *Noteworthy*, we have asked John F. Jennings, former general counsel for education in the U.S. House of Representatives, to set the stage by describing the current status of education in the United States. Harold Hodgkinson, an education demographer, then narrows the focus by telling us what changes to expect in adult and student populations, migration, the economy, and support for public education in our region. The remaining four articles provide snapshots of our region through four lenses — curriculum and instruction, professional development, technology, and finance. These articles are intended to help us set the context and frame our work together for the next four years.

Our work during this period will have a strong field-based research and development orientation. In addition, we will be focusing primarily on four areas: curriculum, instruction, and assessment; human development, learning, and motivation; organizational learning and development; and systems integration and systemic change. Future issues of *Noteworthy* will describe what we are learning in these areas and their implications for you in classrooms, schools, and districts.

We are excited about the work we have proposed in this contract period. We look forward to learning and sharing with you. We hope that this issue of *Noteworthy* and the ones that follow provide you with useful ideas and knowledge that stimulate and inform your work.

Sincerely,

Jim Waters

J. Timothy Waters
President and Executive Director

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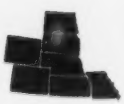

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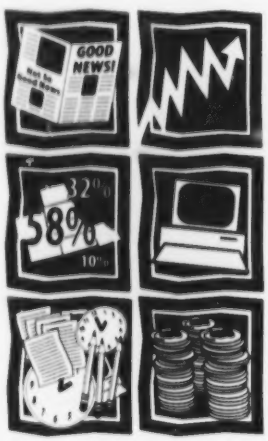
Introduction

America's "heartland" — an area relatively analogous to McREL's service region — is often held up as an icon symbolizing our country's core. Take a look at the seven states in the mid-continent laboratory region. The geography is vast and varied, from the mighty Mississippi on Missouri's eastern border, west through the expansive Great Plains, to the thrusting Rockies; from North Dakota's Canadian border south to Kansas. Vibrant, historic cities — St. Louis, Kansas City, Denver, Omaha — join the fabled "Wild West" of Fargo, Laramie, Dodge City, and the Black Hills.

We residents of the heartland approach the new century anticipating changes at least as significant as those that shaped the present. Can we rely on our education systems to prepare us for change? What issues do we tackle, what problems do we address, to ensure not only the durability but also the excellence of education in the years ahead?



Education issues in our mid-continent region do not differ much from issues across the country. Curriculum and instruction, professional development, technology, demographics, funding — educators and stakeholders nationwide have these same concerns.

What is unique to our heartland is the context in which we consider these issues. This region retains demographic characteristics — Harold Hodgkinson addresses them in his article beginning on page 9 — that will determine its future.

By exploring key education issues in the heartland, this issue of *Noteworthy* seeks to accomplish a dual purpose. First, it strives to be a forum where teachers, administrators, and education stakeholders from throughout these seven states can assess, compare, and contrast the education issues presented by their colleagues. They can also learn about some programs and strategies that have worked within the region.

Second, an examination of issues across the region may spur other, more focused studies. Solving a problem often becomes more manageable and less overwhelming when there is a clear sense of the conditions that surround it.

Let's look at the topics that we explore in this publication. We begin with some national perspective. We called on Jack Jennings and Diane Stark Rentner of the Center on Education Policy to tell us about public perception versus reality in the good (and not-so-good) news about American education.

Next, we look at demographic realities in the seven-state region. Harold Hodgkinson not only shows us that the demographic makeup in the heartland is changing, but explains what these changes mean for education. His article is recommended reading for

everyone who believes — and those who still need to be convinced — that education must be ready to serve a changing constituency.

The next four articles each speak to an aspect of education in the heartland. The topics are curriculum and instruction, professional development, technology, and school finance. The challenges facing educators in each of these topics seem to overlap. A key question in school finance is how to achieve geographic, ethnic, gender, and technological equity. What are the crucial issues in technology? How to pay for it, how to assure equitable access, and how to train educators. What are our professional development challenges? How to change the focus from what educators teach to what all students learn.

The article on curriculum and instruction takes its information directly from those in the field. McREL staff interviewed educators throughout the mid-continent states and then tallied their remarks to identify the most important challenges ahead. Again, responses crossed categories, from standards and benchmarks to professional development to technology.

We residents of the heartland approach the new century anticipating changes at least as significant as those that shaped the present.

As a regional educational laboratory, McREL investigates cutting-edge education methods. Our professionals identify the most promising research and practices. From this applied research, we develop processes and products and disseminate them so that educators across the region can bring reform to their schools.

We want to make a difference in the quality of education and learning for all through excellence in applied research, product development, and service. That is McREL's mission.

The Good, and the Not-So-Good, News About American Schools

by John F. Jennings and Diane Stark Rentner

Public perceptions that our schools are failing, that students know less than they did in the past, and that more students are dropping out of school are shaking support for one of the most important institutions in our society. But are they correct?

It seems that hardly a week goes by without a story in the press or on television about the sorry condition of American public education. So frequent are the criticisms and negative reporting that they are seriously eroding support for public education, at least according to several recent opinion polls. But is this view of public education accurate?

This article describes what our schools have done right and what our students have accomplished in the past quarter-century. It also contains the not-so-good news about what they need to do better. We will look at data in five areas: school dropout rates, the kinds of courses students are taking, the number of years Americans are going to school, financial resources, and student achievement. Only with the facts, both good and bad, can a reasoned debate on public schools proceed.

Drop-Out Rates Falling

One widespread misperception is especially ominous to those who support public education. That is, many people think that the high school dropout rate is increasing. When asked if the high school dropout rate was higher, lower, or about the same as it was 25 years ago, 64 percent of the people who responded to the 1996 Phi Delta Kappa/ Gallup Poll, "The Public's Attitudes Toward the Public Schools," thought it was higher, 18 percent believed it was about the same, and 3 percent replied that they didn't know. Only 15 percent of those polled had the right impression — that the U.S. dropout rate is lower than it was 25 years ago (Elam & Rose, 1996).

In 1970, the dropout rate among all 25- to 29-year-olds was 22.5 percent; in 1994 the rate fell to 12.8 percent. The dropout rate among African-Americans declined also, although not as dramatically. In 1980, 22.4 percent of African-Americans aged 25 to 29 did not have a high school diploma or equivalency certificate; the statistic in 1994 was 15 percent (U.S. Department of Education, 1995a).

While the above school dropout data are encouraging, other indicators paint a less positive picture. Students from low-income families of all races are more likely to drop out of school than are students from middle or high-income families. In 1993, 23.9 percent of 16- to 24-year-olds from low-income families had dropped out of high school, while 9.9 percent of individuals in that age group from middle-income families and 2.7 percent in that age group from high-income had

dropped out (U.S. Department of Education, 1994a).

Furthermore, because minority children are more likely to be poor than are white children, a large gap persists between the graduation rates of white and African-American students, and an even greater gap between white and Hispanic youth. In 1994, 92 percent of the 25- to 29-year-old white population had either a high school diploma or an equivalency certificate, compared with 85 percent of African-American young people and 61 percent of Hispanics in this age group (U.S. Department of Education, 1995a).

Our schools are not failing all children, but they are helping some more than others.

We must direct our attention as a nation to addressing our real problems. In the case of school dropouts, the task at hand is to help poor and minority students stay in school longer. Our schools are not failing all children, but they are helping some more than others. We must find more ways to help all students.

Students Taking More Academic Courses

The 1980s and early 1990s saw intense reform in America's schools. Nearly every state and many school districts toughened high school graduation requirements. The success of this movement has almost totally escaped public attention.

As a result of those reforms, more students are taking more courses and more difficult courses. In 1982 only 12.7 percent of seniors graduating from public schools had taken four years of English and three years each of social studies, mathematics, and science. By 1994, nearly 50 percent of all graduating high school seniors had taken such courses (U.S. Department of Education, 1996a).

This, of course, signals that 50 percent of graduating seniors are still not taking the above core curriculum. Although American schools have made progress in raising the level of course requirements, they still have a long way to go in increasing the number of students who take a core academic curriculum.

Americans Staying in School Longer

Americans are completing more years of schooling than ever before. A quarter-century ago, in 1971, 22 percent of the U.S. population between the ages of 25 and 29 had completed four or more years of college. By 1994, that percentage had increased to 27 percent. Compared to populations in other large industrialized nations such as Japan, Germany, and France, a higher proportion of 25- to 64-year-olds in the United States have completed high school *and* college.

On the other hand, many students who begin postsecondary education do not finish. The consequence they face is that, without obtaining a degree, they may have few avenues for obtaining the training they need for employment. In 1994, 60 percent of all 25- to 29-year-olds had attended some college while 27 percent had earned a bachelor's degree or higher (U.S. Department of Education, 1995b).

U.S. schools devote most of their resources to preparing students for college, although approximately three-fourths of those students will never obtain a baccalaureate degree. This raises a serious issue. The United States invests about $20,000 in each student who goes on to college, which is more than twice

the amount ($9,000) that it spends on non-college-bound youth (U.S. General Accounting Office, 1991; 1990). While continuing to value schooling, we must ask whether we should reallocate more attention and resources to better educate and train the majority of students who will not attain a college degree. Americans may be unrealistic in believing that most students should attend an academic college or university.

Much funding growth has been channeled toward special purposes...

Financial Resources

As a nation we have backed up our commitment to education with funding to pay for it. Between 1960 and 1990, the average per-pupil expenditure for K-12 education in the United States, adjusted for inflation, increased by more than 200 percent (Odden, Monk, Nakib & Picus, 1995).

Much of this funding growth, however, has been channeled toward special purposes, such as desegregation, counseling, health and psychological services, and educating children with disabilities, rather than toward regular academic instruction. In 1980, nearly 80 percent of elementary and secondary education spending was allocated to regular instruction; by 1991, the percentage had dropped to about 59. At the same time, spending on education for children with disabilities increased from 3.7 percent of school budgets in 1967 to 17 percent in 1991. Spending for nonacademic services nearly doubled (Economic Policy Institute, 1995).

Student Achievement

A number of people in the public eye have taken to bashing student academic achievement, bemoaning the "fact" that students are not as smart today as they were 20 years ago. Tests, the primary instruments used to gauge student achievement, show otherwise.

American students take many different tests. These tests vary greatly in their purposes, features, limitations, and accuracy. Although test scores provide valuable information about student learning, they can be misunderstood and misused. In addition, test scores simply may not reflect important student abilities that we do not know how to measure or that may cost too much to do so. Therefore, our discussion about student achievement includes some information about the tests commonly used to draw broad conclusions about student learning.

The United States has no national test of academic performance that all students must take. The closest we have is the National Assessment of Educational Progress (NAEP), a test that the U.S. Department of Education has been administering since 1969. The purpose of NAEP is to measure the performance of students at ages 9, 13, and 17 in reading, mathematics, and science, and to provide results that could be examined over a period of years. Thus NAEP enables us to compare the reading, mathematics, and science performance of students in the 1990s with that of their counterparts from the 1970s.

When making these comparisons, it is important to recognize NAEP's limitations. First, it is administered to a small, although representative, sample of students. Second, American children study different material at different times because curriculum decisions in the United States are made at the local rather than the national level. The items on a NAEP assessment may or may not reflect material that students have covered in school. Third, NAEP is a test with "low stakes," meaning that there is no reward or penalty attached to student scores. Consequently, students may

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not take a NAEP test as seriously as they do an exam that affects their grade or their future. However, NAEP is still one of the best testing instruments available for gaining an understanding of how well students are doing.

In addition to NAEP, data from two international assessments — the Reading Literacy Study, conducted by the International Association for the Evaluation of Educational Achievement (IEA), and the Third International Mathematics and Science Study (TIMSS) — provide insight into U.S. students' academic performance. Both of these assessments take exceptional approaches to ensure valid and reliable international results. However, international tests have many built-in flaws, such as inaccurate translation of test questions, variation in the ages when students study certain topics, and differences in how representative the test-taking population is in different countries. Therefore, the results of international assessments should be viewed with caution.

An examination of general trends from test data shows that student achievement has experienced definite peaks and valleys during the last quarter century. The overall conclusion is that average student performance is no worse but no better than 25 years ago (Mullis, Dossey, Campbell, Gentile, O'Sullivan & Latham, 1994).

The reading achievement of 9-year-olds peaked in 1980, and then fell. By 1992, average scores of 9-year-olds stood about where they were in 1971 (Mullis, et al., 1994). The 1994 NAEP reading assessment shows declines in the reading performance of 17-year-olds between 1992 and 1994 (U.S. Department of Education, 1995f).

On international reading assessments, U.S. students' ability compares favorably to that of students in other large industrialized nations. The IEA Reading Literacy Study found that U.S. fourth graders' reading achievement is surpassed only by student achievement in Finland and Sweden, and that the reading ability of U.S. ninth graders is second only to students in Finland. U.S. students compare favorably to students in France, Sweden, Germany, and Canada (U.S. Department of Education, 1996c).

In mathematics, student performance at all three age levels measured by NAEP improved between 1973 and 1992. Although mathematics achievement had dropped in the 1970s and remained low through the early 1980s, between 1982 and 1992 the trend reversed itself. By 1992, average math achievement had returned to the peak level of the early 1970s for all age groups (Mullis, et al., 1994; U.S. Department of Education, 1995b; 1995e).

The recent TIMSS places U.S. fourth grade student achievement slightly above the international average in math and below only Korea in science. U.S. eighth grade students scored below the international average in math and only slightly above average in science (U.S. Department of Education, 1996b).

Also according to NAEP results, science achievement improved across all three age groups in the ten years from 1982 to 1992. In 1992, 9-year-olds performed significantly higher on the NAEP science assessment than 9-year-olds in 1970.

NAEP shows improvements by minorities also. At all age levels, African-American students improved their performance on the reading, mathematics, and science exams since the 1970s. Hispanic students made similar gains. All in all, the achievement gaps between white and

African-American students and between white and Hispanic students have lessened over time (Mullis, et al., 1994).

The United States still has a way to go, however, before minority students' achievement is on par with that of white students. The last decade's gains in closing achievement gaps appear to be flattening out. White students continue to outperform African-American and Hispanic students at all three ages and in all three subjects in the NAEP assessment.

The United States still has a way to go, however, before minority student achievement is on par with that of white students.

According to NAEP reading data, African-American students, on average, may be entering high school reading as much as two years behind their white counterparts. An analysis of NAEP assessment shows that the math skills of Hispanic 13-year-olds may lag two years behind those of white 13-year-olds. The science assessment also shows a large gap as well. The achievement of Hispanic 13-year-olds is at about the same level as white 9-year-olds (Mullis, et al., 1994; U.S. Department of Education, 1995c; 1995d)

Wide differences in performance also exist between students who attend schools located in "advantaged" communities — those with high proportions of parents in professional and managerial jobs — and children from schools in "disadvantaged" areas — those with high proportions of parents on welfare or who are not regularly employed. These differences appear in reading, math, and science at all three age levels tested. On the 1992 mathematics assessment, for example, 13-year-olds attending schools in disadvantaged areas scored about the same as 9-year-olds from schools in advantaged areas (Mullis, et al., 1994; U.S. Department of Education, 1994b).

While the data indicate that no great progress has been made in moving student achievement beyond the levels of the 1970s, and that considerable achievement gaps exist between white and minority students, we need to recognize that the U.S. student population of the 1990s is far different from that of the early 1970s. In 1970, 15 percent of all children under the age of 18 lived in poverty; by 1993 that number had grown to 22 percent, or one in five children (U.S. Department of Education, 1995a). Education research shows that children who live in poverty have much lower achievement levels than children in more advantaged communities (Mullis, et al., 1994; U.S. Department of Education, 1995a).

Moreover, the nation saw one of its largest waves of immigration during the 1980s. This influx of immigrants means that many children are coming to school with limited proficiency in English. Between 1980 and 1990, the number of children who had difficulty speaking English increased 27 percent, from 1.9 million to 2.4 million (U.S. Department of Education, 1995b).

Many school systems are facing much greater challenges in the 1990s than they did in previous decades. Perhaps we should view as good news the fact that student achievement levels today are comparable to those of the early 1970s. Nevertheless, we must recognize the need to continue our efforts to raise the achievement of all students.

Conclusion

The record of American public education over the past several decades shows that U.S. schools are doing a better job overall than

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critics and much of the news media imply. Americans have made some real headway in reducing dropout rates, increasing academic course taking, raising school graduation rates, and boosting funding for elementary and secondary schools. But we have much more to do, especially because achievement has increased only marginally.

Nearly every state is raising education standards. Before too long, states will be administering more difficult assessments and students will be expected to take more difficult courses. So, schools are on the way to making more demands of students in order to help them to higher levels of achievement. But, parents must support these changes. If more students begin to fail more difficult tests in school, will parents demand that their children study harder and that teachers expect more of them, or will parents demand that the tests be changed to be less demanding? Education is truly locally controlled in the United States, and so parental and citizen support is an essential ingredient in long-term change.

Boosting student achievement will require changes in both our classrooms and our culture. Schools must institute high academic standards and change the way they teach basic academic subjects in order to deepen students' knowledge of them. Parents must set high academic expectations for their children and become involved with the schools. And the larger community must place a higher value on education.

The recent history of education in the United States shows that where there is a national will to change, such as in providing widespread access to higher education and encouraging students to take more rigorous courses, improvements can be made. Thus, if we want to raise student achievement significantly, the nation must place a much higher priority on that goal. Doing so will require a concerted effort, not only from schools but also from parents, students, citizens, communities, and governments.

But let us also celebrate the good that our schools have accomplished, even as we devote ourselves to solving our problems. In contrast to the negative stories that seem to garner news media attention, evidence shows that American public schools are better than many citizens credit them with being. While they have a long way to go before we can say that our children are learning everything they need to know to be productive and knowledgeable citizens in tomorrow's world, our schools and the students they produce are getting better.

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The booklet, *The Good, and the Not-So-Good, News About American Schools*, can be ordered for a modest price (to cover printing and shipping) by calling Phi Delta Kappa at (800) 766-1156.

The authors of this article wish to thank Nancy Kober for her editorial assistance in compiling that publication.

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Demographics in the Heartland

by Harold Hodgkinson

Although there is a lot more diversity within McREL's seven states than meets the eye — ethnically, economically, and educationally — there remain important features that forge these states together now and into the next century.

What defines a "region"? McREL's service area covers a number of states that are sometimes grouped into regions other than that of the "regional educational laboratory." Missouri and Nebraska are usually considered North Central; Kansas is South Central; the Dakotas and Wyoming are generally grouped with Northwest states; Colorado is often put into the Southwest.

Geographically and culturally, these states border on the "Heartland" but do not fit into it. Minnesota, Wisconsin, and Iowa — states commonly associated with America's Heartland — have rich black earth and are right for growing corn and dairy animals. Colorado, Nebraska, Kansas, the Dakotas, and Wyoming have poorer soil and settle for winter wheat and cattle. This latter group of states is a hybrid: Mountain, High Plains, Heartland, Midwest. Missouri defies categorization!

Even when grouped together as a "region," the states in McREL's service area show vast diversity. Their populations vary by growth rate, age, ethnicity, wealth, residence patterns, and other characteristics.

But one vital demographic feature sets off this region from all others. With the lone exception of Missouri, it contains the lowest population density of any "region" in the nation. It is as if a knife divided the country north to south into three, with high density areas to the east and low densities in the area between the western Minnesota border down to mid-Texas across to the Pacific coastal states, where population again picks up. About half of the nation's range land is in McREL's seven states.

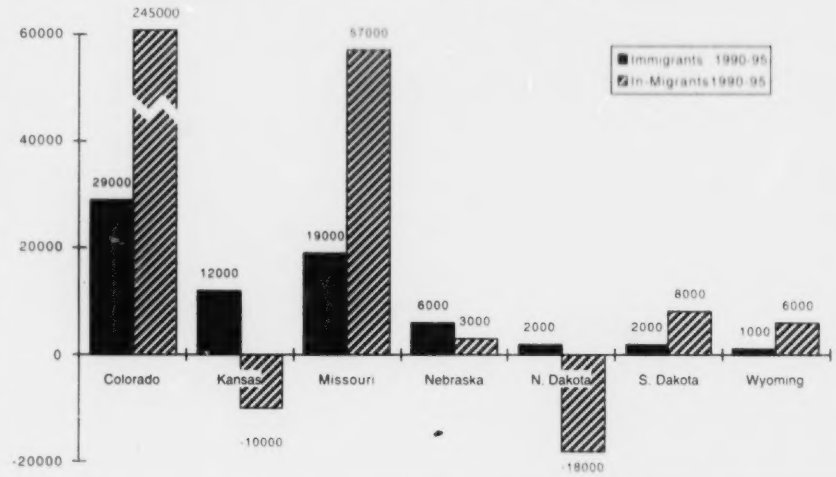
To get a sense of the people living in this region, let's take a closer look at trends in population, age, density, ethnic diversity, and economics, and what they are likely to mean for education in the years ahead.

Population Grows Slowly

Over the quarter-century from 1970-1995, the population in most states served by McREL grew more slowly than it did in the nation as a whole. Colorado was the sharp exception, with population up by 58.5 percent, more than double the national growth of 26 percent. Just between 1990 and 1995, Colorado added 542,000 residents, pushing it up from the 30th most populous state to the 25th.

While the population in Wyoming climbed, too, by 43.8 percent, the increase was only from 33,000 to 48,000, slipping Wyoming from 49th in population nationally to 50th. The population of the Dakotas joins Wyoming's as among the lowest in the United States. Missouri, the most populous state in the region, ranks 16th nationally. However, like its sister-states, its population rank slid during this period.

Figure 1
Immigration and In-Migration by State



The fact that up until now few immigrants from other nations have settled in this region accounts for some of the drop in rank. Between 1990 and 1995, 3.9 million immigrants entered the United States; only about 70,000 of them made their new homes in this seven-state region.

Another important demographic factor common to most McREL states is that only a very small number of citizens moved here from elsewhere in the country. From 1990 to 1995, Colorado took in 245,000 Americans from other states. Kansas and North Dakota actually saw more people move out than move in. However, births and a relatively small number of deaths made up for the out-migration in these two states. Figure 1 shows immigration, both foreign and domestic, into the states in this region.

Public school enrollments increased throughout the region between 1990 and 1995. However, looking at elementary and secondary enrollments separately, North Dakota stands out as one of a small number of states in which elementary enrollments actually declined, even though the state gained 2,000 students overall. This means that births in North Dakota are not high enough for the population to "stay even," that more people are moving out of the state than are moving in, or both.

Changes in population have a severe impact on states. The number of congressional seats a state has and the amount of federal block grant monies it receives both shift as the population shifts. When Texas replaced New York as the country's second most populous state, it gained three new congressional representatives and a minimum of $3 billion in federal block grants. Given population trends in the region, it is fairly safe to forecast that after the year 2000 census, Colorado will pick up a new seat in the U.S. House of Representatives. Representation in the other states will remain the same.

Ethnic Diversity Changing

So far, the McREL region hasn't experienced the enormous ethnic diversification that is taking place in other parts of the country. In every state in the region, ethnic diversity among students is well below the U.S. average of 34 percent. In fact, each, except Colorado, has less than half the ethnic diversity of the nation's school children.

But, the minority "fingerprint" is very different across the region: in Missouri, nearly all minority students are African-American; Colorado has three times as many Hispanics

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Figure 2
Ethnic Diversity by State

ethnic population (in thousands)/percentage of total state population (1992)

State	White	Black	Native American	Asian/P.I.	Hispanic
Colorado	3,200 (81%)	147 (4%)	33 (1%)	70 (2%)	457 (12%)
Kansas	2,300 (88%)	150 (6%)	23 (1%)	36 (1%)	101 (4%)
Missouri	4,500 (87%)	565 (11%)	20 (1%)	48 (1%)	66 (1%)
Nebraska	1,500 (91%)	60 (4%)	13 (1%)	15 (1%)	42 (3%)
N. Dakota	599 (93%)	4 (1%)	27 (4%)	4 (1%)	5 (1%)
S. Dakota	648 (90%)	4 (1%)	53 (7%)	4 (1%)	6 (1%)
Wyoming	448 (91%)	4 (1%)	10 (2%)	3 (1%)	27 (5%)

as African-Americans; and in the Dakotas virtually all minority students are Native American. That is likely to change in the next dozen years.

Between now and the year 2010, if current trends hold, Asian and Hispanic populations will grow the fastest. All of the states in the region will double their Asian-American population, and some will triple it. More of these new Asian-Americans will come from southeast Asia than from China and Japan.

Mexican-Americans will make up most of the new Hispanics. Fewer Hispanics will count Puerto Rica, Cuba, or other South and Central American nations as their country of origin.

The number of African-Americans is expected to increase significantly in Colorado, Kansas, and Missouri and minimally in the other four states. Similarly, South Dakota's Native American population will surge, from 53,000 now to 97,000 in 2010; North Dakota's Native American population will climb as well, but only from 27,000 to 37,000.

In most states in the McREL region, the white population is projected to increase, but just barely. According to current projections, the only significant increases through the year 2010 are likely to be in Colorado and Wyoming. Figure 2 displays the ethnic diversity of each of the states in this region.

In all of McREL's states, the youngest populations are and will continue to be the most diverse. Most of these children will not be immigrants but will be born in the United States. In all of the mid-continent states, the school-age population is less diverse than it is nationally. However, as more immigrants come to this region and the numbers of minority children and youth rise, this region will begin to see the same minority population increases at the preschool and school levels as other regions of the country.

The increased diversity of the school-age population in the McREL service area, as well as the increasing number of minority groups, will require ever more diverse school programs. The diversity will begin in the youngest grades and expand through senior high as these children move through school. The "fingerprint" will remain very different in each of these states — with the minority youth population of the Dakotas overwhelmingly Native American; Colorado and Wyoming's

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heavily Hispanic; and Kansas, Missouri, and Nebraska's mostly African-American.

Age Becoming a Factor

Over time, the average age of the population can be a recipe for disaster because of a simple demographic rule: *movers are younger and better educated than stayers*. As a result, demographically, the population in states with high out-migration gets older faster, with more dependent elderly and a smaller, older work force.

By 2020, the nation will have 27 "Floridas" — states where more than 20 percent of the residents are older than 65. Most of the states in McREL's region will qualify. Already, all of them, except Colorado and Wyoming, have a higher percentage of elderly than the U.S. average. Nationally, 21.6 percent of homes have one or more people over 65. The percentages in Kansas, Missouri, Nebraska, and the Dakotas are higher. Younger Colorado shows a much lower average at 16.5 percent, as does Wyoming at 19 percent.

While the nation as a whole has slightly more than two births per death, the Dakotas, Kansas, and Missouri have more deaths and fewer births, further accelerating increases in the proportion of elderly.

In terms of births per 1,000 people, all of McREL's states place below the national average of 15.5. Births to unmarried women are also below the national average of 31 per 1,000, except in Missouri where they are just slightly above.

The elderly economy also tends to be a "mailbox" economy. Seniors get their money through the mail in the form of Social Security and Medicare checks, pension and stock benefits, and other old-age income. Local and state governments do not benefit from most of this money until the older person spends it. Unsurprisingly, fixed income elderly are particularly resistant to any increase in taxes, because they cannot "earn their way out."

All of these concerns on the part of the elderly have implications for education. As people get older, they become less interested in youth issues. Their own health and financial security take top priority. As many communities have learned, it's hard to pass school bond issues when large numbers of voters are over 65.

An important education indicator is the percentage of state revenues allocated to public schools (a rough "level of effort" statistic). Here, Colorado and Wyoming spend close to the national average of 20.3 percent. Missouri and Kansas provide a larger percentage of education dollars out of state coffers than average, while, as of 1995, state spending for education in the Dakotas and Nebraska is below average (the percentage of education dollars from local tax revenues is particularly high in South Dakota, Nebraska, and Missouri).

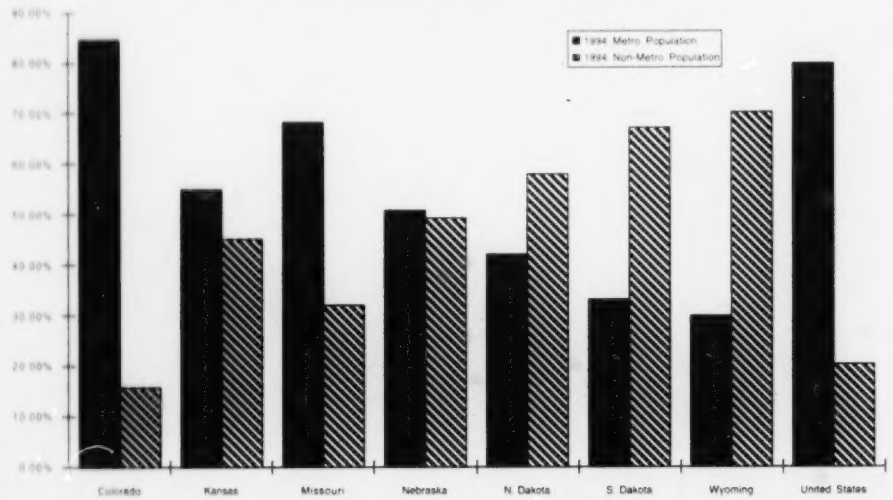
Sparsity Threatens Services

Most Americans, 79.8 percent, live in metropolitan areas. The remaining 20.2 percent reside in rural or "nonmetro" areas. As Figure 3 shows, Colorado has a larger percentage of metro residents than the nation's average; Missouri is close to average; the breakdown between metro and nonmetro residents in Kansas and Nebraska is about half and half. But in the Dakotas and Wyoming, over half of the population lives in rural or nonmetro areas. The large number of Native Americans who live on reservations contributes to the high rural population in these last three states.

Looking at these residence patterns another way, about half of Americans live in suburbs,

one-fourth in big cities, and one-fourth in small town and rural areas. People in the suburbs are generally characterized as having high incomes, high levels of parental education, high demands for youth services, high levels of home ownership (and high property taxes), and low levels of poverty. Except in Colorado and Missouri, this "highly desirable" population (now a majority of U.S. voters) is much smaller in the McREL service area than in the nation.

Figure 3
Metro/Non-Metro Population by State



This demographic profile — with fewer suburbanites and more rural and elderly residents than the nation's average — poses a unique blend of challenges. Providing medical and social services to elderly people in low density areas is about as expensive as these services can get. Delivering 20 Meals on Wheels to the elderly in a New Jersey apartment complex takes about an hour. Delivering 20 meals in parts of Nebraska is likely to take all day, with eight or more miles between stops.

Youth services in low density areas also suffer. There is a practical limit to school consolidation. Many rural communities are simply too isolated to make consolidation feasible, and are left with low numbers of students. While there is no dispute in the research about the many benefits of small schools, the question for administrators is always: How do you hire a physics teacher when the whole high school population consists of only 30 kids?

The Annie Casey Foundation, which annually grades children's quality of life — counting such measures as infant mortality, youth poverty, high school drop-outs, teen pregnancy, violent teen deaths, etc. — ranked North Dakota and Nebraska third and fifth, respectively, in 1996. South Dakota and Kansas ranked 13th and 14th, with Colorado and Wyoming at the U.S. average and Missouri back in the pack.

It is much more difficult to deliver integrated education, health, and social services in low density population areas with few facilities. The consolidation of all social services, including education, will be a continuing issue for many communities in the McREL service area.

Employment Picture Mixed

One of the most accurate predictors of an individual's income is his or her level of education. The states in this region rank outstanding on many education measures.

One of the most telling is the number of 19-year-olds who have accomplished two things: graduated from high school and been admitted to college. These two indicators are a direct measure of the accessibility of education, both at the elementary and secondary as well as higher education levels.

North Dakota leads the nation on this measure. Sixty percent of North Dakota's 19-year-olds are high school graduates with college acceptances. Nebraska, South Dakota, and Kansas also show up well on this crucial measure, but both Colorado and Missouri fall below the U.S. average.

Most McREL states have approximately as many adults with a bachelor's degree as the national average, about 13.1 percent. Colorado, however, has many more. It boasts one of the highest percentages of college graduates in the nation. As of 1992, 18 percent of Colorado's adults had earned a bachelor's degree, and by 1994, the percentage was 21.

Remember that movers are younger and better educated than stayers, and Colorado is an in-migration state. Although it has fewer home-grown high school graduates with college acceptances than the national average, overall, in-migration provides it with a well-educated work force. Colorado taxpayers did not have to dig into their own state funds to pay for many of these people's education. Because almost a third of Colorado's college graduates received their degrees in other states, Colorado taxpayers got a "freebie."

In checking students' SAT scores, a widely used indicator of school quality, it would appear that scores in this region are among the highest in the nation. However, the best single predictor of a state's SAT scores is the percentage of young people taking the test. In all of the mid-continent states except Colorado, only 10 percent or less of the total eligible student population actually take the test. These are the students who intend to go to the elite public and private institutions that demand SAT scores. Most students in this region take the ACT, and, as the percentage of students taking the test increases, scores go down.

While the education level of residents would suggest a region with a relatively average economy, unemployment in McREL's service area falls below the 1994 national average of 6.1 percent. In Nebraska and the Dakotas, unemployment is half that. One factor here, however, may be the number of adults who have given up searching for a job. These people are no longer counted as unemployed. Some residents of Native American reservations in the Dakotas are particularly likely to fall into this group.

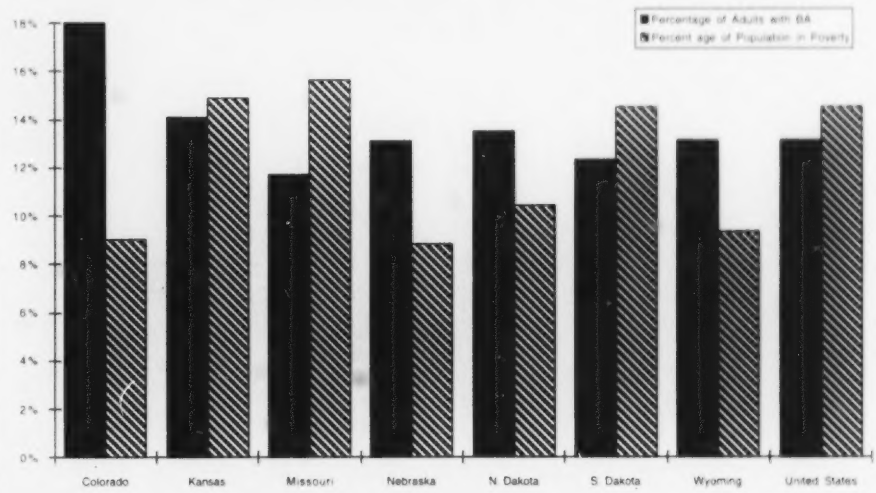
In income ranking, McREL's states are a varied lot. In 1995, Colorado ranked 16th and North Dakota ranked 47th in per capita income. While teachers' salaries appeared to be more stable than salaries generally in this region, they were, nonetheless, below the national average of $36,000. It is notable that Colorado and Kansas have slightly higher teacher salaries than would be expected from the per capita income data.

Four states in this region had fewer people living below the poverty line in 1994 than the national average. Nationally that year, 14.5 percent of Americans were counted as being poor. Nebraska, however, had a poverty rate of only 8.8 percent, one of the lowest in the nation. Colorado's poverty rate was 9 percent, followed by Wyoming, 9.3; North Dakota, 10.4; South Dakota, 14.5; Kansas, 14.9; and Missouri, 15.6.

The schools in Kansas, Missouri, and South Dakota will have to work harder than the

others and will have to provide more specialized funding to assist low income children. In addition, data show that, more often than not, children in special education come from impoverished backgrounds where parents have less education.

Figure 4
Percentage of Adults with Bachelor's Degree vs. Percentage of Population Below the Poverty Line



Additional Demographic Findings

Some demographic findings not easily classified, but nonetheless important in carving out this region's future. For example, for reasons that are still unclear, the mountain states, along with Alaska and Oregon, have the most suicides in the nation. While the nation's average suicide rate is 12 per 100,000 population, Wyoming's is almost twice that at 22, and Colorado's is 17. The remaining states in McREL's region hover fairly close to average. It is important to ask why, in the presence of some of the most beautiful scenery in the nation, if not the world — a factor that is supposed to make people feel better — more people take their own lives than in other states.

On a more positive note, this region regularly produces markedly higher voter turnouts than other parts of the country. More than 60 percent of registered voters in every state in the region voted in the 1992 elections, significantly topping the national average of 55.1 percent.

While most of the states in the region report low incidences of violent crime, the crime rate is especially low in the Dakotas. Rates in Colorado and Missouri are at about the U.S. average. This is not to be unexpected given that large metro areas have the highest crime rates per 100,000 persons and these two states have the largest metro areas in the region.

As of 1995, all of these states, except Colorado and Missouri, had few hazardous waste sites. The Dakotas and Wyoming have some of the fewest in the nation, perhaps because of wide expanses of tribal land.

Conclusion

What defines a region? Despite the diversity across these seven states, they are all heading into the future with many of the same challenges. They will all have more minority youth with a different blend than at present, including a doubling or tripling of the Asian-American student body. Most of the states have less poverty than the nation as a whole, but they also have fewer people who are

considered very wealthy. The Dakotas, Nebraska, Kansas, and Missouri have rapidly growing senior populations. Six of the states have few people moving in or out. Colorado's high influx of newcomers makes it the exception. The crime rate is low everywhere but in Colorado and Missouri, the two states that have "big city" populations. And, while the region holds a mixed bag in quality of life for children, with some states ranking at the top of this measure and others in the middle, not one even approaches the bottom.

Citizens in the McREL states are politically active and voice their concerns about the quality of their public services, especially education. But these same citizens contend with limited personal and governmental finances to implement high quality educational and other services, particularly in the reservations and barrios.

Tomorrow will bring more of the same. Increasing numbers of elderly voters will care less about youth issues. The minority mix will be more complex. States will continue to experience disagreement on devolution from state to local sources of funding and accountability.

Another issue of particular importance will be the large percentage of the population living in low density areas where delivery of educational, health, and social services is very expensive. Most of the states will see little in-migration and immigration. Most are facing economies that are not diversifying as rapidly as in the rest of the nation, resulting in a low rate of job creation and more rural, non-farm residents. In this context, McREL has its work cut out for the next several decades.

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What's Pressing? Everything!

by Joan L. Buttram

Educators in the Central Plains have a lot on their minds. They share their top concerns with McREL.

Picture this. Teachers standing in front of classrooms, leading lessons on the three Rs from textbooks and writing on chalkboards. Students sitting at desks in neat rows, listening or filling in the blanks on their daily quota of worksheets. Everything runs smoothly, as long as the mimeograph machine doesn't run out of paper or duplicator fluid, and the principal's office is willing to take Jimmy when he acts up.

That's the way schools used to be. Today, things are different. Teachers are expected to attend to standards set by their states and professional associations, adapt lessons to meet the full range of students' skills and cultures, pair assessment with instruction, and keep up with technology. And that's just the short list.

McREL recently surveyed educators in the seven-state region about their most pressing concerns in curriculum and instruction. We interviewed 21 educators who have responsibility for curriculum and instruction at state education agencies, school districts, and higher education or intermediate service units. Our purpose was to learn what they considered the three most pressing issues in curriculum and the three most pressing issues in instruction to be in their states. We then asked them why they answered the way they did. Almost all of the interviews were conducted by telephone. The extent of overlap between the two sets of responses was so great that we eventually combined them in the analysis of responses. Here is what they told us.

The majority of responses (almost 92 percent) fell into the eight categories in Table 1.

In identifying the most pressing issues, regional educators split their responses evenly between developing and using

Table 1
Curriculum and Instruction Issues Facing the Central Plains Region

Issue	Responses	Percent
Developing and using standards	28	23
Improving teachers' knowledge and skills	25	21
Using new forms of assessment	18	15
Aligning and adapting curriculum and materials	10	8
Using technology	10	8
Attending to increased classroom diversity	9	7
Building systemic support	7	6
Modifying the school year and schedule	5	4
Other	10	8
Total	**122**	**100.0**

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standards and improving teachers' knowledge and skills. Using new forms of assessment placed third. Together, these three issues accounted for over half of the responses (58.2 percent).

The remaining responses described changes that need to be made in aligning and adapting curriculum and materials, using technology, attending to increased diversity in the classroom, building systemic support, and modifying the school year and schedule.

Developing and Using Standards

This issue dealt specifically with the challenges posed by the standards-based education initiatives currently underway in McREL's seven states. Regional educators first talked about the lack of agreement in defining what "should" be included in the curriculum.

At the state level, we need to define a quality education... what is essential, what is not.

There needs to be consensus about a core curriculum and which content areas are "core." Right now there is none at local, state, or national levels.

We're seeing a lot of disagreement about standards in some subject areas, especially social studies.

It's hard knowing whether curricula emphasize the right things and include everything students will need in their future.

This lack of consensus makes it difficult for educators to move forward with any degree of certainty. It complicates planning and delivering curriculum and instruction because educators must await decisions by state boards and policy makers.

Other regional educators described the difficulty teachers have in translating state standards into daily classroom instruction.

Connecting district and classroom curriculum to the "state" standards is a worry that everyone is talking about.

Teachers are having difficulty understanding how to tie curriculum to standards. They don't know how to move from an activity approach to a standards-based approach so they're reluctant to "throw-out" parts of the curriculum that they do know. Many are used to being autonomous and teaching what they want, value, or know.

Regional educators clearly are immersed in implementing standards-based education.

Some people think current standards-based curriculum reform ignores skills, especially basic skills such as phonics in reading. It's essential to help people understand that teaching skills as well as concepts is important, but that we want to teach skills in context and with applications.

Aligning curriculum with standards and assessment is an issue. There are policies in place for reform, but they haven't been translated into workable materials for teachers.

Regional educators clearly are immersed in implementing standards-based education. They are struggling to determine what to include in a "quality" education, and to

Table 2
Areas in Which Teachers Need Additional Knowledge and Skills

Area	Responses	Percent
Standards-based education	10	20
Diversity in the classroom	11	22
Student assessment	6	12
Alternative instructional strategies	6	12
Student motivation	4	8
Curriculum and materials adaptation	3	6
Content/discipline knowledge	3	6
Technology	3	6
Other	4	8
Total	**50**	**100**

transform textbook-driven lessons and instructional programs into standards-based approaches.

Increasing Teachers' Knowledge & Skills

Approximately one-fifth of educators (21 percent) surveyed indicated that increasing teachers' knowledge and skills was the most pressing need in their states. Not surprisingly, many of the responses in categories other than improving teachers' knowledge and skills also had a professional development slant. Altogether, more than two-fifths of the responses (41 percent) touched on this issue. As Table 2 shows, the areas in which teachers need training vary tremendously.

It's not surprising that many professional development needs centered around standards-based education, given the region's extensive involvement in it. This approach places new demands on teachers. As several educators noted:

Teachers can't see how to put the pieces together... they need to know how to do this because in a standards-based system, you have to offer multiple ways for students to reach standards. Teachers need to offer different opportunities for students because students have different learning styles. Standards-based education is all about changing the focus from what the teacher teaches to what the student learns. If the student doesn't get it, then the teacher must ask what she or he can do to help the student get it.

Teachers need help understanding how teaching standards differs from what and how they have taught in the past.

How do we help teachers get at instruction that matches or advances curriculum standards?

Other educators described demands being placed on teachers as classrooms become more diverse with the inclusion of children with special needs and language difficulties.

Teachers are having difficulty figuring out how to meet the needs of diverse learners.

Teachers have little knowledge and few skills to help all [diverse] learners succeed. Few teachers know how to address diverse learners.

Teachers are going to have to learn to address all the special needs more effectively and at the same time will have to deal with larger class sizes due to budget costs.

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Teachers will have to know how to diagnose student needs and adjust and monitor instruction.

We have to learn how to help all our students achieve the standards.

Assessing student progress is another area regional educators identified as needing professional development.

LEAs don't understand performance-based assessment.

Teachers aren't prepared well enough to develop good assessments. Assessing students at the classroom level and analyzing, interpreting, and using assessment results to improve instruction need attention.

Assessment is the biggest challenge... lack of adequate preparation and experience in developing assessments that can really show what students have learned and how well they have learned it.

Teachers also need additional knowledge and skills in alternative instructional strategies.

There is a need to focus again on effective instructional strategies, and to get back to the art and science of good teaching.

We need to abolish the idea that there is a "magic bullet" or one strategy that will work for everyone in every context. Teachers need to be able to choose the right strategy for the context. They need skills that will let them look critically at strategies and know when and why to use each.

Teachers have a limited repertoire of instructional strategies. They have difficulty talking about different ways of teaching because they use only one or two strategies. They seem not to have "gotten" the instructional tools that were taught to them over the last decade.

The following array of comments points to additional areas where educators see a need for professional development.

Teachers need help locating good sources of information... they need to be able to look at materials and decide what is useful in helping students meet standards.

Teachers' lack of depth in specific content areas. Again, this is because of the lack of adequate preparation.

Teachers don't have the skills to work with technology.

Many teachers do not know how kids learn.

Using New Forms of Assessment

Changes in assessment accompany changes in curriculum. About 15 percent of our respondents identified better assessment as a pressing need. In many cases, respondents worried about their ability to assess students' attainment of standards.

We don't know how to monitor student progress toward meeting standards... Standards also mean different things to different people. We need to develop a common understanding of what is "good enough" to meet a standard.

...how to... assess students' mastery of knowledge and skills standards. We need to be sure that students are learning the things we've identified as important, and we need to... be confident that our assessments are valid and reliable, especially on

standards and benchmarks required for graduation or for moving to the next grade or level of schooling.

The biggest challenge currently is aligning assessments to standards and standards-based curricula, and developing rubrics.

Others worried more about changing from multiple choice tests to performance-based assessments. As noted earlier, many teachers have had only minimal exposure to these latter assessments.

Developing performance assessments to judge curriculum and learning is a big issue.

We need to learn how to develop assessments that are really aligned to curriculum benchmarks.

We need to attach rubrics to assessments so students understand what quality work is.

Still others were concerned about connecting instruction and assessment.

Making assessment a regular part of the teaching process is new for us.

Understanding data-driven instruction is a challenge. Teachers are having difficulty using assessment to drive instruction.

Assessment issues are complex and multi-faceted and closely linked to the development and use of standards.

Aligning and Adapting Curriculum and Materials

Regional educators reported that another pressing issue is the alignment and adaptation of curriculum and associated materials across disciplines and grades. With the ever increasing information explosion, more and more educators are pushed to define explicitly what they will teach at each grade level. In addition, there is mounting pressure to connect learning in school to the real world. As a result, teachers are being asked to rely less on textbooks and to incorporate other materials into instruction whenever feasible.

Regional educators reported that another pressing issue is the alignment and adaptation of curriculum and associated materials across disciplines and grades.

Articulation across grade levels is a problem. Many teachers have not taken the time to examine what gets taught at each grade level.

Elementary teachers don't know what is taught in secondary courses and don't have an adequate understanding of what secondary teachers expect students to have learned in elementary school. Likewise, secondary teachers don't know enough about what is being taught at the elementary level and what they can or should expect students to know when they come to them.

The nature and role of textbooks have changed. In the past, teachers could teach from a textbook and cover the knowledge of that field. Now there are so many sources of information that teachers can't rely on the text as the only source.

Adapting curriculum materials, not only texts but materials in general, is something we need to know more about. As strategies change and technology advances, selecting the right curriculum becomes more critical.

Curriculum alignment across grades and disciplines is an issue that has troubled many school districts for decades. Reliance on textbooks has decreased with increasing access to the Internet.

Using Technology

Schools are increasingly under pressure to expand the use of technology in classrooms. But in many schools, the lack of equipment and access limit these opportunities. Educators in our sample were most concerned about how to integrate technology into the educational program so that it becomes an effective instructional tool.

Technology is a big issue. There's lot of discussion... right now about getting all the schools on line, but there's also a need to use technology as an effective instructional tool and meaningful part of the curriculum.

We need to know how to integrate technology as an instructional tool effectively. Too often we see technology being addressed as a separate subject, fragmented rather than integrated with other strategies.

Integrating technology into both curriculum and instruction needs to be a higher priority. It's too often an add-on, separate from the curriculum, or it's even used as a toy, for games. It needs to be used effectively as an instructional tool; understanding technology concepts and uses, and using technology skills, needs to be integrated with the curriculum.

Attending to Increased Classroom Diversity

Many of the respondents pointed to the challenges that an increasingly diverse student population places on schools. As mentioned earlier, both new English learners and special needs students contribute to the increasing diversity in regional classrooms.

Teachers are having difficulty figuring out how to meet the needs of diverse learners. They wonder what the accountability will be.

Teachers worry about how to adjust instruction so every student achieves.

Addressing all special needs successfully in inclusion classrooms is a concern. There is a greater push for inclusion of labeled students in the classroom.

Our challenge is adapting to the varied needs of all of our students in the classroom and having the toolkit to address their needs effectively.

This issue is likely to intensify in coming years if demographic projections hold for the region (see the Hodgkinson article on page 9 for more discussion on this topic).

Building Systemic Support

A small percentage of responses (6 percent) addressed the need for parts of the educational system to change. In some cases, respondents pointed to the need to build parental or community support.

Educating the public is becoming critical. Some of the standards are not "traditional" so the public worries — and misses their importance.

Others described teachers' resistance to change.

Bad experiences in the past have made teachers resistant to change and jaded. Experienced teachers have been through lots of reform movements. Change is coming, and we need to address the issue. If not, the outcomes may not be what we hope for.

In both cases, regional educators realize that all stakeholders need to participate in building a shared vision to guide schools.

Modifying School Year and Schedule

With increased calls for high standards, many districts or schools are considering changing the school year calendar and schedule. The former is intended to increase the length of time available for education, while the latter would segment the school day into more appropriate learning blocks.

Students need more time on task. We need to look at block scheduling, extended day, more tutors from the community, longer school days, etc.

We need to modify the calendar so it reflects professional development and student learning needs. The calendar needs to be driven by instruction, not drive it.

Calls for modifying the school year and schedule continue to grow. Many of these changes will have significant implications for teacher contracts and school operating budgets.

Other Issues in the Region

The remaining 10 responses addressed an array of concerns, including the need to expand resources for education (3, or 2.5 percent), emphasize higher order skills (3, or 2.5 percent), pay greater attention to educational R&D (2, or 1.6 percent), expand early childhood programs (1, or .8 percent), and reflect community needs in educational programs (1, or .8 percent).

Conclusion

The mid-continent states face challenges similar to those in many other parts of the country. There are conversations about standards, assessment, and professional development wherever one goes. Diversity and technology also claim their share of discussion time.

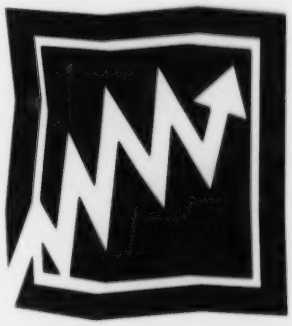
A strong commitment to education, increasing racial and ethnic diversity, rural isolation, and local control all color and complicate how the region will confront these issues. Each of the seven states has initiatives in place to address many of them. Nevertheless, as one South Dakota educator observed, the overriding challenge will be deciding "what is important, what do kids need to know... and what kinds of activities do we have to design and use so kids can learn."

Targeting Professional Development At Student Success

by Ceri B. Dean and Fran E. Mayeski

New standards for students are changing what and how we expect teachers to teach. As a result, new professional communities are appearing all across the McREL region.

Jascha Heifetz' violin professor told him that if he practiced hard, someday he would play well enough to teach others. And after years of performing in concert halls all over the world, Heifetz finally decided he was ready to teach at UCLA.



Unlike Heifetz, most teachers do not spend years "performing" before they begin their teaching careers. They learn to become competent and effective teachers on the job. And for that, they need continuing professional development.

In this article, we explore how some of the states and districts in the McREL region are providing teachers with the kind of professional development that leads to the creation of a professional community concentrated on improving student achievement.

Professional development activities in the region center on:

- increasing teachers' knowledge of subject matter and pedagogy;
- engaging teachers in activities that help them reduce the gap between goals for student achievement and students' actual performance; and
- developing infrastructure to support teachers' learning.

All three of these activities are crucial to creating a professional community that is ready to rally around student achievement (Hawley & Valli, 1996; Joyce & Showers, 1995; Little, 1995; Newmann & Wehlage, 1995; National Commission on Teaching and America's Future, 1996; Darling-Hammond, 1996).

Newmann and Wehlage (1995), in particular, make clear the importance of such a professional community. Their research found that the level of professional community in a school had significant effects on student achievement — as much as 31 percentile points. It made no difference whether that achievement was measured as authentic performance or as performance on a standardized test.

Knowledge of Subject Matter And Pedagogy

Like many other states around the country, each of the seven states in McREL's region has curriculum frameworks or content standards. In some cases, states developed them; in others, districts developed them. These frameworks and standards introduce new content, suggest new instructional approaches, or both. The problem arises when teachers are expected to teach this new material without ever having had the opportunity to learn it themselves as

students, or when they must teach in ways that they have never been taught.

States and districts throughout the region are providing teachers with professional development opportunities so they can meet these new expectations. The following examples are of how teachers in this region are acquiring the new knowledge and skills they need.

In Kansas, educating students to become effective problem solvers is an important goal of the state's standards. But mathematics teachers' previous instructional experience with problem solving was limited, usually to "contrived" word problems that appeared at the end of the chapter in the text. Since the concept of problem solving in the state's curriculum documents is considerably more complex, teachers had to improve their own understanding of problem solving before they could successfully teach problem-solving skills to their students.

For teachers who themselves were taught to find the answer in textbooks, these new instructional practices can be a challenge.

How should professional development activities be framed so that teachers could build such knowledge? In Manhattan, Kansas, teachers devoted an hour-and-a-half every other week to examining student work, learning about problem-solving strategies they could teach their students, developing a plan for teaching the strategies across grade levels, and discussing their classroom experiences in actually teaching the strategies. And they were rewarded for their efforts. Female students' problem-solving scores on the Kansas Mathematics Assessment Test jumped 41 percent (49.6 to 70.17) and male students improved by 3 percent (53.55 to 55.37) over a three year period. Equally important, students now enjoy problem-solving more, persevere in their efforts, and use their problem-solving skills in other content areas.

Curriculum frameworks frequently require teachers to align curriculum, instruction, and assessment, another skill in which many teachers do not have a lot of experience. In South Dakota, a collaborative team of staff from the state department of education, Technology and Innovations in Education (TIE), and the Black Hills Consortium is conducting a year-long series of two-day seminars for teachers and administrators in three regions of the state. The seminars help participants understand the rationale behind standards from national and state perspectives and how to tie local standards and curriculum to larger reform goals. Working in small groups, participants discuss their beliefs about what is important for students to learn and how to design curriculum that reflects their beliefs.

Curriculum frameworks and standards shift the instructional emphasis from what is taught to what is learned. There is usually a strong emphasis on using research-based, inquiry-oriented, and hands-on instructional practices. For teachers who themselves were taught to find the answer in textbooks, these new instructional practices can be a challenge. Professional development, then, must provide teachers with experiences in using research, methods of inquiry, and learning by doing.

Technology, in particular, is an area in which many teachers need to raise their comfort

level. To help its teachers learn such skills, one district in Colorado took a comprehensive approach by passing a technology bond issue that included designated funds for professional development. The district used the funds to develop "teacher-friendly" courses on navigating the Internet, provided software demonstrations and give-aways, offered technical support to help teachers plan for and use technology to enhance their lessons, and designed and implemented an evaluation component to ensure that it met its goals. Teachers were also able to buy personal computers at a special price, which allowed them to practice and learn at home at their own pace. This comprehensive approach gave teachers an appreciation for the new technology. Now they are using it with confidence across the curriculum. As one teacher put it, "I feel rejuvenated. The Internet has opened a whole new world. Now the computer is an instructional tool, rather than the object of instruction."

...mathematics teachers used data that students generated in science class as the basis for lessons in data analysis and statistics.

In Gillette, Wyoming, the middle school's project-based science program incorporates not only the use of technology, but also cooperative learning groups, a facilitative teaching style, alternative forms of assessment, and the expectation that students will take responsibility for their learning. All of this posed a new way of teaching for many teachers in the district. To build teachers' knowledge and skills in these innovations, the district hired a consultant who mentored two teachers for a year. The following summer, the district introduced all middle school teachers to the technology and the new teaching techniques. The consultant continued to make bimonthly visits to the school to coach teachers, answer their questions, and facilitate discussions about the changes they were seeking in student learning.

Teachers say they could never go back to the old way of teaching. The new approach has given them a better understanding of how students learn science. It has also raised their expectations of students, based on what they have seen students produce as evidence of their learning. Additionally, the program has fostered increased cooperation between mathematics and science teachers. In one instance, mathematics teachers used data that students generated in science class as the basis for lessons in data analysis and statistics.

The new program was not formally evaluated for changes in student achievement, but teachers anecdotally report that their students' quality of work is better and that they "seem to like science more."

The preceding examples show how some teachers are acquiring new subject matter knowledge and pedagogical skills to improve student learning. In the next section, we see how professional development is changing to help teachers narrow the gap between the goals that states and districts have for students and student performance.

Analyzing the Gap Between Goals and Achievement

States in the McREL region have defined standards for what students should know and be able to do and are beginning to hold students accountable for meeting those standards. But before they can fully

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implement their standards, teachers need an important new skill. They need to be able to analyze gaps between the goals of instruction and students' achievement of those goals.

The need for such a skill comes up over and over in the research on professional development. From their synthesis of that research, Hawley and Valli (1995) identify a key principle in the design of effective professional development programs: that is, the programs be "driven, fundamentally, by analyses of the differences between goals and standards for student learning and student performance."

The new nature of professional development must give teachers opportunities to learn how to assess student performance...

This principle differs radically from most current professional development practices in the region, which tend to be unfocused or focused on teachers' needs and goals instead of on broader student learning standards. The new nature of professional development gives teachers opportunities to learn how to assess student performance "by doing, reading, and reflecting; by collaborating with other teachers; by looking closely at students and their work; and by sharing what they see" (Darling-Hammond & McLaughlin, 1995).

The examples that follow illustrate several ways in which teachers, schools, and districts in the region have revised their professional development efforts to better attend to these skills. Educators in the McREL region who are seeking ways to make their professional development programs more responsive to the emphasis on analyzing the gap between goals and achievement, may benefit from information about these programs.

In Lawrence, Kansas, each semester the school district funds several building-level instructional skills teams to lead the effort to improve student achievement. Each group, made up of six or seven teachers and the school principal, determines its own scope of work depending on which of its school goals it wants to address. For example, if the team decides that it wants to make improved reading achievement its priority, it might study different strategies for teaching reading. It would work together on specific instructional skills for at least a semester — reading research and best practice articles related to instructional strategies in reading, practicing the strategies in their classrooms, discussing their experiences, examining student work, and observing and coaching each other. When the group has mastered a particular skill or strategy, its members often become specialists or mentors who other teachers can call on for assistance.

In North Dakota, groups of teachers who earlier had participated in developing reading and writing frameworks set out to develop reading and writing assessment items. The intent was for the state to use these items, in multiple choice, short answer, and performance task formats, to assess students' language arts knowledge and skills against the state's curriculum framework.

The groups met for 10-11 days over a year and a half. Learning about the issues of reliability, validity, and bias were high on their agenda. By closely examining student work, reflecting on what they had learned as a member of the group, and discussing the issues with others, they learned to write

assessment items that elicit responses that better demonstrate student competence in achieving the standards and benchmarks. Their process for working together allowed them to develop new skills and knowledge in assessment, curriculum, and instruction and to form a learning community that is willing and able to share its knowledge beyond the original group.

According to Judith Warren-Little (1996), "A school organized for teacher learning would promote the systematic study of teaching and learning... by supporting the individual and collaborative investigation of selected problems and questions that arise in teaching..." Action research offers one way to engage teachers in such a process and an audience for sharing their results.

Action research involves teachers in collecting and analyzing data for the purpose of examining student learning and their own teaching. Here is an example of how one teacher in Nebraska used it. This teacher presented his students with a new hands-on method for learning fractions. Later, he asked them to use this method in an assessment of students' skills. Information from the assessment gave him insight into students' thinking and especially about the misconceptions they had developed about fractions — misconceptions that he was able to then correct.

According to a teacher in Kansas, action research made her more analytical and data-driven. She now seeks out solid evidence that her teaching is making a difference in student performance. Similarly, a teacher in Wyoming attests to the power of action research at both a personal and professional level. "I gained a great deal from having the opportunity to be a part of this [action research on alternative assessment]... I had previously done a lot of reading about alternative assessments, but never had the time or courage to actually make the necessary changes... I [now] feel more comfortable with alternative types of assessment, and have become more of a partner in learning, not only an instructor. I am anxious to share ideas with other teachers. I'm excited about planning for next year using what I have learned from this study" (Tyrrell & Walker, 1994).

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The above examples demonstrate that, as teachers focus on analyzing the gap between goals for students and student achievement, the kind of professional development that is most useful to them is closely aligned to the learning goals they expect their students to achieve. In order for them to have such professional development, however, supportive policies and practices must be in place at the building, district, and state levels.

Infrastructure to Support Teachers' Learning

A professional development system is "an integrated whole: a cohesive framework for professional growth within which a variety of learning activities, people, resources and policies are connected" (The Regional Laboratory for Educational Improvement of the Northeast and the Islands, 1989.) But finding the time and money for professional development continues to haunt districts and states across the region.

There was a time when professional development was considered a "frill." Not so any

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longer. Professional development is increasingly being recognized as the key to successful reform (Richardson, 1997). "Every dollar spent on improving teacher quality resulted in improved student performance, found one study" (Darling-Hammond, 1996).

Missouri has proven its commitment to professional development. The state designates that one percent of the monies allocated for education be spent on professional development that helps schools meet the objectives of their school improvement plans. With additional funds, it established and maintains nine Regional Professional Development Centers that serve as resource centers, provide leadership training for teachers, assist districts with their school improvement processes, and develop activities that directly support state reform initiatives. The state also set aside money for the "Success Leads to Success" grant program. This program seeks out and disseminates information about best instructional practices and programs and encourages educators to establish school-to-school networks for exchanging practical information and tips.

[Missouri] designates that one percent of the monies allocated for education be spent on professional development...

In their study of education reform, O'Day, Goertz, and Floden (1995) found that "allowing schools and districts to reconfigure schedules to provide time for collaboration and learning is possibly the most cost-efficient means of providing at least some of the time required" for teachers to learn how to improve student achievement. The National Commission on Teaching and America's Future (1996) reinforced its finding with the recommendation that teachers receive "at least 10 hours per week for collegial work and learning within the school and at least two days per year of additional professional development time, supported by reallocations of staff and the redesign of responsibilities."

The Thompson School District in Colorado is one example of a district that is taking steps to enact the commission's recommendation. The district sets aside one half-day each week throughout the school year. During this time, teachers participate in district, building, or subject-area professional development activities that are aligned with their professional growth plans. In the summer, teachers attend a five-day institute where they develop curriculum and plan for the coming year. According to the district, its money is well-spent because the teachers see a direct connection between their professional development activities and improved student achievement. In addition, teachers are more professional, work more collaboratively, and interact more effectively with parents.

In their article on policies that support professional development, Darling-Hammond and McLaughlin note that there has been a "shift from policies that seek to control or direct the work of teachers to strategies intended to develop the capacity of schools and teachers to be responsible for student learning" (1996). This is certainly true in North Dakota, where state guidelines for professional development aim to give school personnel information on effective professional development, not dictate their strategic planning efforts (North Dakota Education Standards and Practices Board, 1996).

Some states, Wyoming and Kansas are two in this region, are making professional

development part of their accreditation process. Their policies require districts and schools to plan, provide, and evaluate professional development against student performance. Other states, such as Colorado, highlight standards for educators (Colorado Department of Education, 1994). These standards clearly define what constitutes excellence in teaching. Implicit in them is the maxim that developing professionally is part of a teacher's responsibility (Danielson, 1996). Although many state policies are in the early stages of development, they signal that those in positions of power are beginning to understand that teacher learning is key to improved student learning.

Conclusion

Throughout the McREL region, schools, districts, and states are acknowledging that "[w]hat teachers know and can do is the most important influence on what students learn" (National Commission on Teaching & America's Future, 1996). The professional development activities they have taken on — strengthening teachers' knowledge of subject matter and pedagogy, engaging teachers in activities that reduce the gap between goals for student achievement and student performance, and developing infrastructure to support teachers' learning — are directly targeted to the creation of professional communities that can make improved student achievement possible. These communities have the power to produce results.

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Reshaping Schools for the Information Age

by James D. Parry

Shifting technologies are challenging educational content, methods, and infrastructure. Schools that respond successfully will have leaders committed to a new vision of teaching and learning and stakeholders ready to assume new roles and responsibilities.

The arrival of the Information Age brings the same high drama to education as did the introduction of the printing press five-and-a-half centuries ago. Before the printing press, curriculum was transmitted orally; teachers and learners with superior verbal and auditory skills fared well. As mass-produced texts became available to both affluent and not-so-affluent members of society, reading and writing became the predominant way of transmitting curricula. What educators saw happen was that the *method* of education changed as did the curriculum itself.

The present shift to computer-based, multimedia technology is similarly giving educators a new educational tool that will change teaching, learning, and curricula. Educators and others about to embark on this shift have a three-step task in front of them: to formulate a vision of the kind of education-with-technology they desire; to build the understanding and capacity they need to infuse technology into teaching and learning; and to understand and accept the fact that all education stakeholders will have to assume new roles.

This article will explore each of these three steps. In addition, it will probe some other technology-related issues, including disparities in financial resources and access, equity for special student populations, funding strategies, the equipment upgrade treadmill, and professional development.

Formulating a Vision of Technology-Infused Schools

For purposes of this discussion, technology infusion refers to the incorporation of technology tools, products, and applications throughout an education organization that is dedicated to preparing students for the Information Age. But incorporating technology, as anyone who has tried to do it knows, is not an easy or smooth process. Today's school operations often inhibit different visions of schools in the future. Feil (1996) observes, "Even among those teachers most proficient with technology, many classrooms are still teacher-centered; to the disadvantage of the learner, roles are not changing. In many cases, this is because teachers do not have a vision of life in the approaching century."

While Feil uses the term "teachers," it is safe to extend her observation to most members of the education community and perhaps to citizens in general. Even in schools with an abundance of computer hardware and applications, classrooms are still set up with rows of desks all facing the teacher who lectures to students from the front of the room. A stroll

down school hallways does more to reinforce than challenge the familiar notion of the little red schoolhouse with the clanging bell.

A New Place for Learning

The new technology will change the place where teaching and learning occurs. Dyrli & Kinnaman (1994) note, "When schooling began in America, the school building was the place for learning because that's where the resources were located. Information was primarily contained in books and the minds of teachers. And since books and teachers were in limited supply, it made sense to collect them in one location." With the advent of modern technology, they point out, "School buildings can no longer be treated as the place for learning." With telecommunications resources and interactions available in many locations, a school building is not the only place where learning occurs.

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Dyrli & Kinnaman offer a new image of schooling. They propose that "going to school in the future will have little to do with transporting students to information. It will be about moving information to students. School will be everywhere." Brauer (1995) echoes the call for a new image. He writes, "Technologies like the Internet force us to stop thinking of school as a place and focus on school as a concept." Kinnaman (1996) reinforces this thinking further by noting, "School should have more to do with *getting* someplace than with *going* to a place."

Progressive leaders are expanding the term "school" to reflect "everywhere," a "concept," "desktop school," and "interconnected global network of neighborhood gathering places." Mecklenburger (1996) probably sums it up best when he counsels that "Educators — that is, the people historically responsible for schooling — had better read the tea leaves; education is going where the computer power is going."

While the benefits of face-to-face interactions among teachers and students are as important as ever, these visions that Kinnaman and other leaders share for the future of schooling keep the pressure on to embrace a new meaning for school that reaches far beyond a "place."

Changing Notions of Learning Time

Technology will influence the concept of learning time in at least two ways. First of all, it will speed up the time in which one can send and receive information. Kinnaman (1995) and Negroponte (1995) respond to this issue directly in their reply to "where the computer power is going." Kinnaman states, "Most of the talk about the convergence of televisions, telephones, and computers misses the point. Convergence is simple — the PC is it! Everything else — televisions, telephones, radios, fax machines, and more — eventually gets sucked into the PC, cannibalized by ever faster and more powerful processors."

Negroponte concurs about the formidable position of the PC. He states, "The growth of personal computers is happening so rapidly that the future open-architecture television is the PC, period. The set-top box will be a credit card-size insert that turns your PC into an electronic gateway for cable, telephone, and satellite. In other words, there is no TV-set industry in the future. It is nothing

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more or less than a computer industry: displays filled with tons of memory and lots of processing power."

Second, technology changes when learning takes place. Negroponte contrasts broadcast information, exemplified by the radio and television, with current technological capabilities, calling technology's distributed information "digital life." He notes, "Digital life will include very little real-time broadcast. As broadcast becomes digital, the bits are not only easily time shiftable but need not be received in the same order or at the same rate as they will be consumed... For example, it will be possible to deliver one hour of video over fiber in a fraction of a second (some experiments today show that the time needed to deliver one hour of VHS-quality video can be as small as one-hundredth of a second)... On-demand information will dominate digital life. We will ask explicitly and implicitly for what we want, when we want it." People — students, teachers, and administrators included — will no longer have to acquire information at a certain and specific time.

> ...it will be possible to deliver one hour of video over fiber in a fraction of a second...

A Transformed Concept of "How"

A recent article authored by four San Antonio fourth-graders imparts impressive predictions about how learning will take place in technology-infused schools. Carter, Childress, Mullican & Sheubrooks (1996) present their view of a fourth-grade classroom in 2016. They write, "Each student has a notebook-sized computer on his or her desk... The classroom's computers are networked into the teacher's master computer, which acts as a file server and a massive storage device. The computers are also connected to the library where thousands of CD-ROM disks can be 'borrowed' to the laptops. CD-ROM disks in 2016 are made in the classroom. They hold text, color, sound, video, and camera-quality graphics." It is likely that schools will achieve these fourth-graders' vision much sooner than 2016. Nonetheless, their descriptions offer meaningful insight into changing teaching and learning environments.

Building Capacity for Technology Infusion

Many educators across the region are still uncertain about education technology's role in curriculum and instruction. It is true that some schools and education centers are undertaking progressive, innovative projects that integrate technology meaningfully. Some of these projects focus on learning about the technology itself. Others lean toward a stronger curriculum emphasis and use technology as a tool to help students attain challenging standards. But my discussions with educators in these schools indicate that, despite the apparent success of their projects, many of them still find the relationship between technology and education elusive. Should technology be considered its own subject area? Should technology be integrated as a tool to facilitate teaching and learning in other content areas? Or, both?

Let's return for a moment to our opening discussion about the curriculum shift that took place with the invention of the printing press. As books became vital learning tools, the importance and value of reading skills increased dramatically. Thus, educators placed a lot of attention on students acquiring the reading skills they needed to pursue text-based information. The growth of students' reading skills paralleled the growth of their

knowledge in various content areas presented via text.

In a recent article, Satchwell and Dugger (1996) argue that acquiring technology skills should receive the same kind of attention by being a core subject area. They contend, "Technology influences our society and culture by changing our lives and our environment. Since education is an important component of our culture, the study of technology must be an essential part of our educational core or basic subject requirements in grades K-12 and beyond."

Clearly, students today need fundamental technology skills. Basic keyboarding and word processing are important, but so are experiences with more sophisticated telecommunications and multimedia applications. These are the advanced tools of the Information Age. Students equipped with fundamental technology tools have a much expanded retinue of learning experiences open to them.

Technological Literacy: More Than the Three "Rs"

What is appropriate technology infusion? Insights about how new technology tools influence curriculum might be helpful in clarifying the meaning of "technology-infused teaching and learning."

Ohler (1996) reflects on the preponderance of visual skills associated with multimedia and suggests a fourth R. He states, "Because of the emergence of multimedia technology, we are being forced to expand one of the cornerstones of our academic culture. The 3 Rs are becoming the 4 Rs: Reading, 'Riting, 'Rithmetic, and aRt. With the growing popularity of multimedia comes... the language of multimedia... There are three major components to this language: an understanding of the 'grammar' of aesthetic presentation, loosely referred to as 'design;' a grasp of skills needed to manipulate media in meaningful ways; and the ability to use these skills to express a vision in terms others can appreciate."

Capturing the fourth R in a term like "aRt" may narrow the curricular implications of multimedia too much. Yet progressive educators generally concur that essential curriculum and instruction now need to include the visual power of multimedia.

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In addition to calling for a fourth R, Ohler looks ahead to the implications of converting to a new method of communicating curriculum. He predicts, "During the inevitable transition period from text to multimedia, teachers will experience a loss of control. They will not be able to guide and evaluate student multimedia projects nearly as effectively as text-based projects they are used to... The 'writing across the curriculum' movement of the past decade will be followed by a similar movement in which art is infused across the curriculum. There will be a long transition as the text-based culture that dominates educational structure retires and makes way for one based on multimedia. But in time, students and teachers will be expected to communicate using a number of media in much the same way that they are currently expected to read and write effectively, regardless of their field of study."

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Ohler's observations speak directly to teachers' unease about technology. Teachers are steeped in text-based curricula. Classroom instruction, assignments, and grades still are primarily text-based. Converting to multimedia-based curricula is likely to bring teachers' insecurities about their own multimedia skills and about what multimedia-based teaching and learning looks and feels like.

Multimedia add new dynamics to the concept of literacy. Dede (1996) contends that the arrival of the Information Age is dramatically shifting the educational community's perceptions of basic literacy. He states, "Expanding traditional definitions of literacy and rhetoric into immersion-centered experiences of interacting with information is crucial to preparing students for full participation in 21st-century society."

McKenzie (1996) offers further definition by suggesting three types of literacy that provide students with the capacity to make meaning out of data. He proposes text, numerical, and visual literacy:

Text Literacy: Good teachers have always taught students to be critical readers, but the task of finding meaning in thousands of pages of electronic text is a new challenge requiring new skills.

Numerical Literacy: Understanding the modern world requires some ability to think mathematically, analyze databases and crunch numbers. Once students have the vast databases of the U.S. Census available on their desktops, they must know how to ask powerful questions about relationships and use a spreadsheet to find answers.

Visual Literacy: While most young people learn more than half of what they know about the world through visual information, few schools teach them how to probe the information critically. Teachers can show students how to look below the surface to grasp the content of a photograph, the strategies of an advertisement, or the emotions of a painting.

Models such as McKenzie's demonstrate the nuts and bolts of technology-infused teaching and learning. Another model that stimulates and builds teaching appropriate to the needs of Information Age learners is the Technology Challenge for Rural America (TEC-RAM), South Dakota's technology challenge grant. TEC-RAM involves six rural school districts and four other partner agencies. The goal is to improve teaching and learning by engaging in systemic reform. Since 400 miles separate some of the sites, TEC-RAM leaders use technology to facilitate project interaction and operation. But the real goal of the project is to design technology-infused teaching and learning experiences at each of the local school sites. TEC-RAM is guided by a steering committee, a collaborative decision-making group representing all the sites and partners. Project evaluators are active partners with the steering committee. All players share ownership and responsibility for project decisions.

New Roles for Educators & Stakeholders

The Information Age brings with it new responsibilities and practices for administrators, teachers, students, parents, and community members. The rapidity with which technology is moving forward obliges educators and other stakeholders to become lifelong learners. Educators especially have an important role in lifelong learning because, as they engage in learning that equips and prepares them for Information Age education, they in turn demonstrate the value of lifelong learning to others.

Sheekey (1997) observes that the Telecommunications Act of 1996 is "carving out a new role for school boards as service providers." He contends that the Act "compels school boards to take a leadership role in ensuring that all households, as well as schools, have access to educational services."

As wired schools lead to wired communities, a host of policy questions surfaces for school board members. Sheekey queries, "What assurance is there, for example, that advanced networked services will make teachers' jobs any easier?" He hypothesizes, "Some might argue that the job will become more demanding as parents and students gain greater access to teachers. How does that increased access factor into the teacher contract? Will teachers have to be paid more if they are spending more time interacting with parents and students outside the confines of the usual school day?" These and other related issues stretch school board members in directions that reach far beyond traditional school operation.

Similarly, the Information Age calls on students and teachers to function differently. Students must become more active and responsible participants in the learning process. While teachers will still function as instructional leaders, their dispensing knowledge to students will be replaced by collaborative, cooperative experiences that will sometimes even blur the role of teacher and student.

"Teachers won't be replaced by technology, they'll be replaced by teachers who know technology," states a student in a presentation to the U.S. Department of Education (Mehler, 1996). Her succinct message challenges educators to face up to the "threat" of technology. Those educators who are truly committed to their profession will engage in lifelong learning that includes acquiring new skills with technology tools and products.

The four San Antonio fourth-graders mentioned describe a fourth-grade teacher in 2016. They project, "The teacher in this classroom has to play many roles. She is part computer technician and part information highway tour guide... Although the computer has made her job easier, it has not replaced the teacher. She is still the resident expert on curriculum, learner behavior, and motivation."

"Teachers won't be replaced by technology, they'll be replaced by teachers who know technology."

The students' insights clearly suggest new roles for teachers, while reinforcing some traditional facets of teaching that remain important for Information Age schools. The message is clear: Make new roles a priority but don't lose sight of the value of present ones.

Financial Disparity of Technology Resources and Access

A snapshot of technology infusion in schools across the region demonstrates a continuum of "haves" to "have-nots." In South Dakota, for example, schools spend anywhere from a discouraging low of $15 per student annually on technology to outlays that exceed $350. Districts on the low end of the continuum possess a few obsolete computers that students use to learn keyboarding, word processing, and the like. These districts appear to be on a technology plateau. They bought computers, installed them in classrooms, and are now looking back and saying "been there, done that."

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Schools on the high end of the expenditure continuum boast sophisticated network configurations with high speed access to the Internet and major efforts to incorporate multimedia applications into the learning environment. The focus is on learning and applying appropriate technology and applications to the learning goals at hand. The impressive technical infrastructure at these schools is generally accompanied by strong, visionary leadership and a genuine commitment to teachers' professional development.

This is not to say, however, that all "have-not" schools lack appropriate leadership. There are many reasons why a school might fall into the "have-nots." Perhaps the community is experiencing high unemployment, severely constrained tax revenues, or the school is located in an isolated area far from any telecommunications infrastructure. Any one of these conditions can quash the good intentions of even the most skilled school leaders in building a sophisticated technology infrastructure.

All too often, such scenarios play out in communities where students come from economically disadvantaged or geographically isolated homes. These students have no access to technology tools either at home or at school, making them double "have-nots."

McREL's region has plenty of "have-nots," from depressed midwest cities to isolated ranch areas of the Plains. But, as the small Britton School District demonstrates, cognizant leaders can find remedies. This system of 500 students in northeast South Dakota approached the technical infrastructure issue in a dynamic and collaborative manner. First, it forged partnerships with local businesses. Then it engaged in a meaningful planning process, made local commitments, and pursued grant resources. Its efforts paid off handsomely and today the district has high-speed access to a wealth of telecommunications resources.

Faculty professional development experiences are a key factor in the district's technology plan, as are instructional designs that offer high school students learning opportunities in a multimedia environment. School leaders, while pleased with the progress, remain focused on the future. According to the paradigm they live by, educational technology and school change are moving targets needing constant attention.

Equity for Student Populations

The equity issue can involve schools and districts, as described above, or it can involve population groups within a school or district. Even schools that have significant access to technology may exclude some students from learning experiences with technology. Females and students with disabilities are two groups that often face obstacles in accessing and using technology.

Some female students tend to shy away from the mechanical and mathematical character of computers. School leaders need to help these students overcome their reticence by offering relevant, supportive opportunities for success with technology.

Students with disabilities may also require special attention. Schools may need to adapt aspects of their technology infrastructure for students with special needs. Usually, it is more efficient to include those adaptations in a school's initial technology plan. Thus, as school leaders design technology systems and develop technology plans, they should involve representatives knowledgeable about equity in their discussions.

Strategies for Funding Technology

Issues of disparity and equity are intertwined with fiscal resources. As noted earlier, South

Dakota schools spend between $15 to $350 per student annually for educational technology. Such a disparity is tied to a host of variables, but in the end boils down to two questions: "How much do we have to spend?" and "What should we spend our money for?"

The answer to the "how much" question hinges primarily on tax structures and funding formulas. "What to buy" decisions are usually made according to district priorities. In most cases, the "how" and "what" responses combine to reflect the value and importance a district places on educational technology.

Constrained local funding for schools has induced many districts to pursue state, federal, or private grant monies. For example, in the autumn of 1996, education entities throughout Colorado competed for a piece of the $20 million the state made available through the Technology Learning Grant and Revolving Loan Fund. The initiative allowed them to use the money for infrastructure, educational program development, and training.

Other examples abound, including projects in Nebraska and South Dakota that are funded through the Technology Challenge Grant program sponsored by the U.S. Department of Education. These projects emphasize partnership and collaboration for effectively integrating technology with teaching and learning. However, while grants present applicants with a window of opportunity and encouragement, the downside is that many school leaders have to struggle even to commit the energy and resources for the grant writing process.

Accessing Federal Funds

More commonly, school leaders strive for federal flow-through funds, typically referred to as "Title" monies. Optimists are encouraged that the current federal budget offers stability and even increases for many Title programs that support technology. For the first time, the Title III Technology Literacy component of Improving America's Schools legislation was funded and holds hope for new resources to flow to schools. Having survived the recent debates of Congress, the Title programs are generally viewed as a relatively stable, year-to-year resource for enhancing technology efforts.

Addressing school change effectively has more to do with new thinking than new monies.

Currently, implementation of the Telecommunications Act of 1996 captures the attention of many people in the education community. Without a doubt, the Telecommunications Act holds tremendous implications for school districts across the region. This past May, the Federal Communications Commission accepted the recommendation of the Federal-State Joint Board on Universal Service to provide schools and libraries with deep discounts (90 percent in some cases) on transmission rates, internal connections, inside wiring, and Internet services.

It has been said that addressing school change effectively has more to do with new thinking than new monies. There is little doubt that most school districts could put new financial resources to wise use. But the trap of limited funds often precludes educators from taking risks and making the most of the resources available to them.

Perhaps the biggest key to successful technology funding is setting priorities that support technology-infused teaching and learning.

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Whether they have many or few fiscal resources, school leaders must deliberately choose technology as a priority. In one school district, for example, this may mean forgoing a new series of textbooks and acquiring instructional software instead. Another district may spend its money on training teachers in technology rather than on giving them new desks. Even though the choices are tough and potentially personal, the decisions that school leaders make can move educational technology capacity forward or hold it back. The challenge for educators in the McREL region is to keep sight of what can be done rather than not done.

The need to upgrade hardware and software will be like a continually moving treadmill confronting school leaders.

The Technology Upgrade Treadmill

Technology will continue to advance rapidly. That is a given. The need to upgrade hardware and software will be like a continually moving treadmill confronting school leaders. Buying computers or getting on-line can put a school on the treadmill, but it takes continued investments to keep the treadmill rolling.

Stepping off the treadmill leaves schools trapped with obsolete hardware and diminishes their capacity to equip students for the Information Age. Staying on the treadmill builds stamina and capacity to move with technological advancements. Wise leaders will keep the "old" computers going by putting them to uses for which they are appropriate. But they will also stay apprised of new technology developments, revisit their technology plans regularly, and upgrade as resources permit.

A Technology Planning Paradigm

As technology races forward and curricula and practices change, school leaders will be groping for ways to direct their organizations. Even respected administrators with proven leadership abilities and successful planning skills experience stress and uncertainty in such circumstances. More than ever, school leaders need planning models that encourage and revitalize stakeholders who are puzzled and fearful of change.

For the most part, the process of planning for technology follows traditional steps: assess the current status, formulate a vision, identify gaps, and develop actions to move forward. But educational technology plans differ from conventional education plans in a couple of significant ways.

First, the planning process is just as valuable, if not more so, than the plan that emerges from it. The planning process is an active learning experience that builds the technology capacity of team members and the district. Second, the process engages the planning team in an ongoing cycle. After team members produce the initial plan, they begin the process over again, assessing their district's technology status, revisiting and adding clarity to their vision, and identifying new gaps. Keeping current with technology is an ongoing process.

The Custer School District, a rural Black Hills system of 1,240 students, demonstrates the importance and value of sound technology planning. Nearly two years ago, district leaders engaged planning team members in a structured process to build a vision and action plan for educational technology. The team discovered the value of the process for professional growth, as well as for clarification and focus. Within months after the plan was

approved, new developments brought them back together. They revisited their plan and kept the cycle active. As a result, the district is now implementing its plan and simultaneously shifting and adding to it. Appropriately, leaders are proud of their progress and realistic about new challenges.

As a planning team learns and grows, its plan changes. The plan is a work-in-progress. That may not be very reassuring to conservative school leaders whose goal is to produce a planning document. However, this planning model is in full accord with the rapidity of technological change and empowers school leaders to guide their districts through it.

The South Dakota TIE project's work with a group of rural school districts serves as another example. The planning teams in those rural schools took part in a dynamic, ongoing, capacity-building process that will position them for technology funding opportunities. Their intent is to have an edge on other districts seeking the same funds.

The Priority of Professional Development

Professional development empowers the education community to confront myriad technology issues. As educators build their awareness, knowledge, experience, and skills through professional development activities, they learn to cooperate and collaborate with partners to forge solutions to whatever problem confronts them at the moment.

One issue is identifying and accessing appropriate professional development experiences. But even when appropriate training opportunities are available, many educators struggle to carve out the time to participate. Others avoid it altogether because they're uncomfortable with technology. Or maybe they don't see a purpose to building their capacity when they don't have ready access to the technology in their classrooms. Education leaders need to alleviate these concerns and make ongoing professional development one of their highest priorities.

Education leaders need to... make ongoing professional development one of their highest priorities.

Educational technology will always pose new challenges. Sound professional development will help educators view them through fresh lenses. Such professional development is probably the greatest requirement facing schools across the McREL region

Conclusion

Carter, Childress, Mullican & Sheubrooks, the fourth-grade students looking at the future, offer an insightful big picture for educators across the McREL region. They state, "Finally, there must be breakthrough in what and how students are taught. Our classroom in 2016 isn't designed for 25 students all doing the same thing at the same time! The technology we envision requires major changes in education. It can't just be an add-on to the way things are done today. Teachers and students still need to make more choices as they utilize the diversity of information that computers provide. The screens will be windows on the world, and because media will be interactive, the students will have a global audience. The Internet will be the field trip bus of 2016. Parents, technologists, and educators will need to rewrite the curriculum so that it makes the best use of this dynamic technology. Then our equipment, in the hands of wonderful teachers, will work education miracles."

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These students' poignant observations provide a powerful benchmark for educators in their efforts to incorporate educational technology. With such capable students and other stakeholders as partners, educators can reap the rewards of reshaping Information Age schools.

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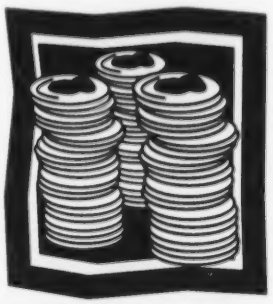
Issues and Trends in School Finance

by Michael L. Arnold

Public K-12 education represents a substantial investment in the region's economic and social future. That makes school finance one of the fastest moving issues in education policy.

The equitable allocation of funds to educate the region's children persists as a concern among educators, business and community leaders, and policymakers in McREL's region. It is also one of the most complex, calling upon states and local communities to act upon their vision of the region's economic and social future.



Each of the seven states distributes its funds to schools according to a unique system that reflects its general circumstances and values. However, all of them employ a foundation-type program in which the state guarantees districts a minimum level of funding per pupil. Typically, districts can raise additional money beyond the guarantee if they so choose (Guthrie, Grams & Pierce, 1988).

One of the most popular methods for comparing and assessing school funding systems is to look at states' current operating expenditures per pupil (COEPP). These operating expenses encompass the cost of instruction — teachers' salaries and curriculum materials, for example — as well as support services such as administration and student transportation. In general, states in the mid-continent region spend less per student than do states in other parts of the country. In 1993-94, the average COEPP for the country was $5,767 (see Table 1). In this region, Wyoming spent the most per pupil ($5,899), ranking it 16th in the nation.

Following Wyoming, the national rankings of the mid-continent states were: Kansas, 23; Nebraska, 24; Missouri, 29; Colorado, 32; N. Dakota, 40; and S. Dakota, 42.

But COEPP reveals only some of the picture. States and districts differ in what it costs them to provide educational services. These differences obscure real variations in their purchasing power. For example, funding comparisons often overlook the higher costs associated with small schools and districts, making them appear more resource-rich than they actually are.

Any analysis of school funding must also take inflation into account. Over the past five years, funding increases in several states have been offset by the rising costs of the goods and services that schools buy. In some states, funding, in real dollars, actually lags behind where it was five years ago. In Colorado, Missouri, and North Dakota, the Consumer Price Index (CPI)-adjusted COEPP was lower in 1993-94 than it was 1989-90. The other four McREL states experienced real increases in their COEPP, with South Dakota recording the largest increase (6.8 percent) over the five year period.

Critics will point to recent reports that the CPI over-adjusts for inflation. Most education finance experts, however, believe that the CPI understates inflation for education because

the costs of educational goods and services actually rise faster than those included in the index.

School Funding Equity

Most states have spent years working to improve the equity of their school finance systems. Nonetheless, equity remains a complex concept that is difficult to translate into state policy. Now, recent legal decisions demanding equitable education for students regardless of location, wealth, or other non-education related conditions have heightened the issue even more.

Three Principles of Equity

Three principles dominate a state's development of equitable school finance policy and systems (Berne & Stiefel, 1984). The first is known as horizontal equity. Horizontal equity assumes that all children have equal educational needs and that there are no variations in the costs of schooling. Under this principle, which is based on the "equal treatment of equals," perfect equity is achieved when there are no disparities in the resources distributed to children.

The weakness of horizontal equity is that it fails to recognize the varying educational needs of children and the resulting cost differentials. Hence, there exists the principle of vertical equity. Vertical equity calls for allocating more resources to students whose education costs more. Often referred to as the "unequal treatment of unequals," vertical equity is reflected in state provisions that give extra funding to students with special needs. It is also the basis on which many states provide additional funding to school districts in sparsely populated areas.

The third principle is equal opportunity. Under this principle, differences in the distribution of education resources are considered equitable as long as they are based upon educationally relevant factors. The principle is reflected in Walzer's (1983) argument that social goods, such as education, should be free from dominance. Walzer explains: "No social good, x, should be distributed to men and women who possess some other good, y, merely because they possess y without regard to the meaning of x." In other words, the amount and quality of education a child receives should not be based on the income level of his or her family or on some other factor (e.g., gender) that is not educationally relevant. Efforts to develop school finance systems that are wealth-neutral are based on equal opportunity arguments.

Table 1

Current Operating Expenditures Per Pupil, National Rank, and Percentage Change in Real Current Operating Expenditures Per Pupil (COEPP) from 1989-90 to 1993-94

State	1993-94 COEPP (Unadjusted)	National Rank (Unadjusted)	% Change in Real COEPP from 1989-90
Colorado	$5,097	33	-6.0
Kansas	$5,659	23	3.4
Missouri	$5,114	29	-1.5
Nebraska	$5,651	24	1.4
North Dakota	$4,674	40	-3.1
South Dakota	$4,586	42	6.8
Wyoming	$5,899	16	5.6
United States	*$5,767*	--	*0.1*

Note: Data from the* Digest of Education Statistics 1996 *(Table 165) National Center for Education Statistics, U.S. Department of Education.

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Historically, the inequities that have plagued state school finance systems have been due, in large part, to the fact that local communities fund public schools (Odden & Picus, 1992). Because local funding is based on local wealth, usually property values, it can vary substantially among districts. There is also a corresponding variation in the revenues local districts can generate.

Table 2
Percentage of Revenues for Public Elementary and Secondary Schools by Source and State, 1993-94

State	Local	State	Federal	Private
Colorado	48	44	6	4
Kansas	34	58	6	3
Missouri	51	38	7	4
Nebraska	55	33	6	6
North Dakota	40	43	12	5
South Dakota	60	26	11	3
Wyoming	41	52	6	2
Mid-continent	*47*	*43*	*6*	*4*
United States	*45*	*45*	*7*	*3*

Note: Data from the Digest of Education Statistics 1996 *(Table 156). National Center for Education Statistics, U.S. Department of Education.*

The result is that districts with above-average property values can generate above-average revenues, while poorer districts must either tax themselves at higher rates or provide fewer or lower quality educational services. Plaintiffs in many school finance litigation cases argue that state school finance systems need to adjust for wealth disparities among districts and strike a balance between local and state revenues for schools.

Nationally, 45.2 percent of school revenues come from state taxes and 45.1 percent come from local taxes. The federal government provides only 7 percent of all public school revenues (see Table 2). As a group, states of the mid-continent region veer slightly from this national average, with a larger percentage of their education funding coming from local sources. Still, there is considerable variation in the division of state and local revenues going to public education. In Kansas and Wyoming, state funds account for more than half of all public school revenues. Conversely, in Missouri, Nebraska, and South Dakota, local funds account for more than 50 percent of total public education revenues.

South Dakota, in particular, is an anomaly in its percentages of local, state, and federal school funding. In 1992-93, state funds accounted for only 26 percent of school revenues. The federal government, however, provided South Dakota schools with a relatively large percentage of its total revenues (10.7 percent). Still, the reliance on local property taxes is heavy, raising concerns about equity. These concerns may be allayed somewhat by a new funding formula taking effect in 1997, which will increase the state's required share of public school funding and provide the same basic aid for all students.

The Trend Away From Property Tax Reliance

Many states are seeking alternatives to potential inequities arising from an over-reliance on the property tax. When a steadily declining state share of school funding in North Dakota forced school districts to raise more of their own revenues, many districts hiked the traditional property tax. But

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districts that were too poor to raise taxes began falling by the wayside. In 1995, the state legislature came to the rescue by passing a biennial education budget that shifted state funds from property wealthy districts to poor districts. Signed into law by Governor Edward T. Schafer, the legislation included a supplementary equity fund of $2.2 million that was distributed outside the regular funding formula. Two years later, in 1997, another $3.1 million was appropriated to improve equity for children in poor districts.

An over-reliance on local revenue sources also created disparities in Missouri's school spending. The state responded with a new system of education funding that, when fully implemented, will provide an additional $553 million to public schools. The new funds will come from higher corporate income taxes and changes in state income tax regulations.

Another state in the mid-continent region, Wyoming, takes the prize for one of the most pathbreaking events in school finance equity. In November 1995, the Wyoming Supreme Court ruled that the state's system of financing public schools was unconstitutional because it created unjustifiable disparities in spending levels among the state's 49 school districts. As a remedy, the court ordered the state legislature to bring the funding method into constitutional compliance by July 1, 1997.

In his majority opinion, Chief Justice Michael Golden specified that in designing the new funding system the legislature must first identify the proper education to which all Wyoming children are entitled. Next the state must determine how much it would cost to provide this education "basket" to all children, taking into account factors that influence costs such as small enrollments. Having done so, the legislature must then find a way to fund the basket.

In June, the legislature completed work on the education finance reform bill. Under the new bill, the state will provide an additional $26 million to local schools. Although the new system has its critics, Wyoming becomes the first state to identify the elements of a quality education, determine how much it costs to provide a quality education to all children, and develop a way to pay for it.

In many states, schools are finding themselves unable to keep pace with the rising costs of inflation because of caps placed on school spending.

Tax Limitation Efforts Hit McREL States

Recent state and local tax limitation movements pose another major issue for states in the mid-continent region. These movements have had significant effects on local schools. In many states, schools are finding themselves unable to keep pace with the rising costs of inflation because of caps placed on school spending. School and district administrators are struggling to deal with the impact this shortfall will have on the quality of education they deliver to children.

Nebraska has been hard hit by tax limitation efforts. In 1996, the state legislature limited school spending increases to two percent in 1997-98, followed by no increase in 1998-99. Another measure will cap local property tax levies for most districts in the 1999-2000 school year. Faced with the prospect of fewer revenues, measured in real dollars, schools may have to severely cut back services in order to keep pace with inflation, or provide children with services of lower quality.

In June, the state legislature provided some relief when it passed, and Governor Ben Nelson signed into law, a bill appropriating an additional $110 million for the 1998-99 school year to alleviate part of a projected $200 million shortfall.

Several other states are also feeling the pinch of tax limitation efforts. The Kansas legislature passed a measure that cuts the 35-mill levy by 2 mills in 1996-97, with another 2 mill reduction the following year. In South Dakota, voters rallied behind a law requiring two-thirds approval for tax increases. As in Nebraska, these provisions could have serious consequences for children.

The unpopularity of the property tax is one of the driving forces behind the tax limitation movement. The property tax, however, does have some distinct advantages over other types of taxes. Property taxes raise large amounts of revenue and provide a stable source of income for schools. Revenues generated through sales and income taxes, on the other hand, tend to fluctuate with the economy (National Conference of State Legislatures, 1996). During times of economic prosperity, they are attractive revenue sources. Shortfalls resulting from economic downturns, however, raise serious concerns about the desirability of relying on sales or income taxes to fund schools.

Property taxes offer another advantage as well — they are deductible from federal income taxes. Shifting taxation to other taxes, such as sales and income, reduces the property tax deduction on federal income. In other words, if taxpayers pay less in local property taxes, they may end up paying higher state sales taxes, state income taxes, and/or higher federal taxes.

For at least the foreseeable future, property taxes are likely to continue as the primary source of public school financing. Even states that have overhauled their school funding programs still employ the property tax. Michigan is a case in point. There is a wide misperception that Michigan's 1994 school finance reforms totally eliminated local property taxes as a means of funding education, but that's not totally true. While the legislature did provide considerable property tax relief, the property tax still accounts for a substantial amount of the support for local schools (Kearney, 1995).

...one-third of the country's schools are in need of extensive repair or replacement of one or more buildings.

Funding Facilities Renovation

Up until now, the deterioration of America's public school buildings has not received a lot of attention, but that, too, is changing. Health and safety hazards, such as leaky roofs, outmoded electrical wiring, and malfunctioning plumbing, are rising to the top of policymaking agendas at the local, state, and national levels. According to a nationwide survey of America's school facilities for the General Accounting Office (GAO) (1995), one-third of the country's schools are in need of extensive repair or replacement of one or more buildings. The GAO estimates that it would take about $112 billion over the next three years just to bring these schools into acceptable condition and to comply with federal mandates.

In the mid-continent region, a high percentage of schools report at least one building in need of extensive repair or replacement (GAO, 1996). In Colorado, Kansas, and Nebraska, more than 30 percent of the schools report having at least one inadequate building. In Missouri, North and

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South Dakota, and Wyoming, more than 20 percent of schools make this claim (see Table 3).

Table 3
Selected Statistics on the Condition of School Facilities by State

State	% Schools with at Least One Inadequate Building	% Schools with Buildings Needing Upgrade or Repair	Per Pupil State Funding for K-12 School Facilities
Colorado	32	89	105
Kansas	38	88	16
Missouri	27	90	0
Nebraska	35	75	0
North Dakota	23	88	48
South Dakota	21	78	0
Wyoming	24	82	80

Note: Data from the General Accounting Office (1996) School Facilities: Profiles of School Condition by State *(GAO/HEHS-96-148). Washington, DC: U.S. General Accounting Office.*

Arguably, South Dakota is in the best condition. The state reports the lowest percentage of schools in the region with at least one inadequate building and the second lowest percentage of buildings needing extensive repair or replacement to bring them to good overall condition. However, South Dakota is one of three states in the region, along with Missouri and Nebraska, that provides no state funding for K-12 school facilities.

Additional Financial Concerns

Schools reflect state and local community values about the importance of investing in the future. As states strive to improve their school funding programs, the systems they develop will reveal the relative importance of education as compared to other priorities, such as building prisons.

Currently, the cost of special education is a hot topic in several mid-continent states. Many people argue that the higher cost of educating students with special needs draws resources away from "regular" students and is therefore inequitable. It is true that special education enrollments increased from 1987 to 1992 (Parrish, 1996). It is similarly true that 38 percent of new education money between 1967 and 1991 was spent on special education (Rothstein & Miles, 1995). A major challenge for policy makers is finding ways to balance vertical equity concerns with rising expenditures. One state, North Dakota, has tried to address this issue by appropriating an additional $3.7 million for special education funding.

Several other issues will also confront states. School choice will play a greater role in the coming years. As of the 1996-97 school year, only Colorado, Kansas, and Wyoming had passed charter school legislation and only Colorado had charter schools in operation. Other states are investigating the possibility of enacting charter school legislation but there continues to be opposition among some groups. Foes argue that charter schools will drain resources away from local school districts. This argument, along with others, has not been sufficient to halt the progress of charter schools. Nonetheless, lawmakers must take care not to financially disable districts in which charter schools are established. Some citizens' groups are working to extend choice via vouchers.

Some school districts must also deal with burgeoning enrollments, while others confront a steady decline in student population.

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Although school district consolidation has run its course in most of the region, there are communities, most notably in Nebraska, where it is still a divisive issue. Linked to consolidation is efficiency, which is going to be a key issue as schools work to become more effective with fewer resources. Finally, ensuring that all students have access to high quality technology will be a challenge that will require considerable resources.

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This book will be invaluable to any school district seeking to articulate a comprehensive set of standards. It will aid in decisionmaking related to curriculum and assessment. Finally, it will help educators recognize and take advantage of the possibilities for subject area integration.

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- (303) 337-0990
- info@mcrel.org
- http://www.mcrel.org/standards-benchmarks/index.html

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